SOUTH FLORIDA WATER MANAGEMENT DISTRICT

WELCOME

Robert Shuford
Lead Scientist
Ecosystem Restoration and Capital Projects

sfwmd.gov

19th Annual Public Meeting on the Long-Term Plan for Achieving Water Quality Goals for the Everglades Protection Areas Tributary Basins

February 28, 2022

AGENDA

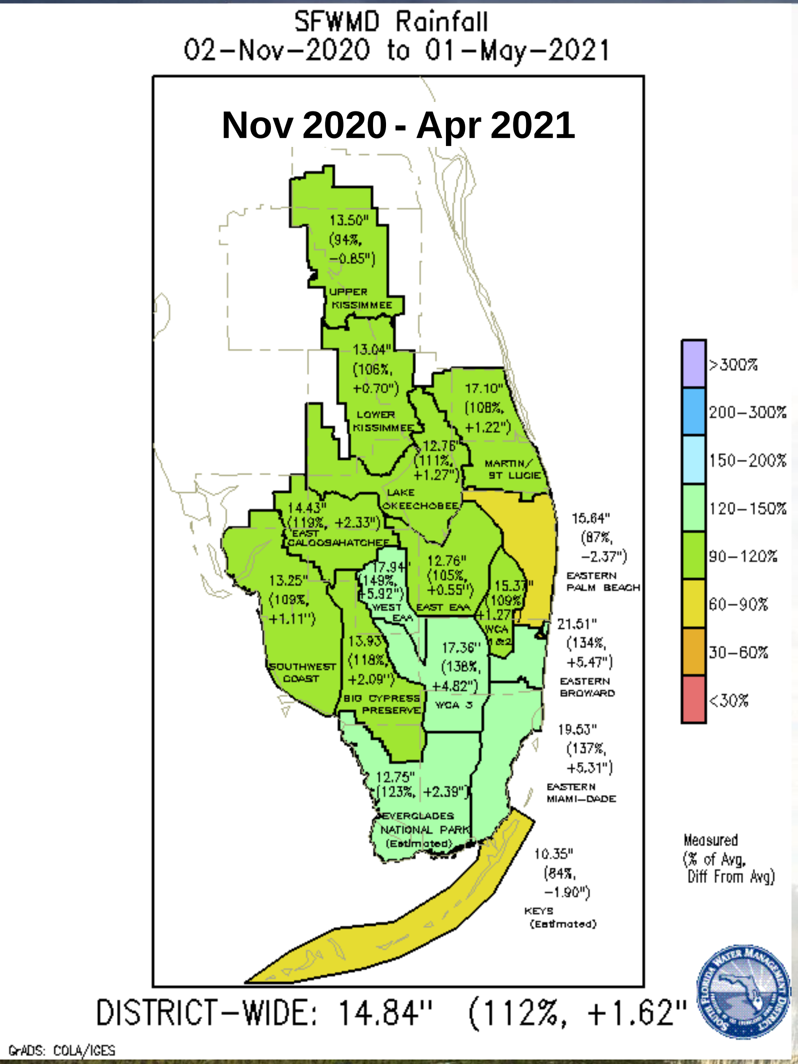
1. **Welcome and Introduction** **9:00**
   Robert Shuford, Ecosystem Restoration and Capital Projects Bureau
2. **System Conditions** **9:05**
   Jose Otero, Ecosystem Restoration and Capital Projects Bureau
3. **Everglades Stormwater Treatment Areas (STA) Performance Update** **9:25**
   Jake Dombrowski, Applied Sciences Bureau
4. **STA Vegetation Management and Enhancement** **9:45**
   Eric Crawford, Land Resources Bureau
5. **Status of Restoration Strategies Science Plan Studies** **10:05**
   Tom James, Applied Sciences Bureau
6. **Restoration Strategies: Design and Construction Update** **10:25**
   Lucine Dadrian, Engineering and Construction Bureau
7. **Southern Everglades Nutrient Source Control Program Update** **10:45**
   Steve Sarley & Youchoa Wang, Everglades and Estuaries Protection Programs Bureau
8. **Public Use on SFWMD Stormwater Treatment Areas** **11:05**
   James Harbaugh, Land Resources Bureau
9. **Public Comment** **11:25**

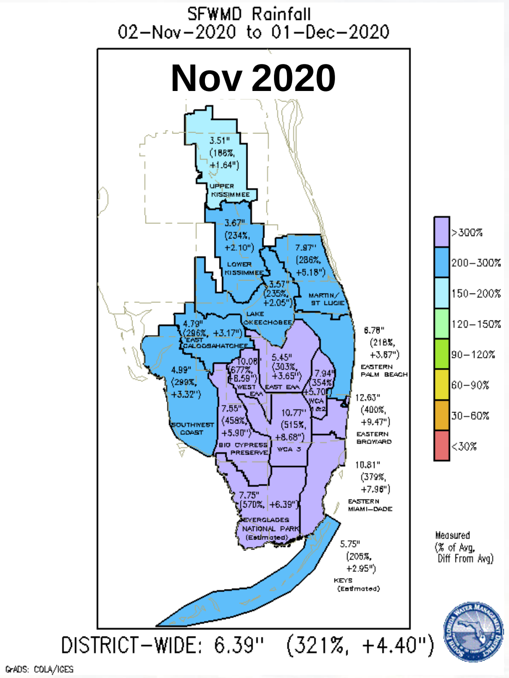
Systems Condition

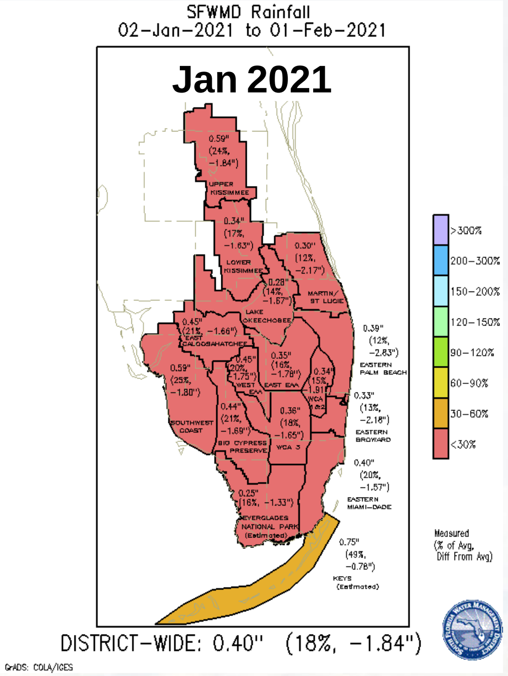
Jose Otero, P.E.
Section Administrator
Ecosystem Restoration and Capital Projects

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Rainfall Dry Season Water Year 2021

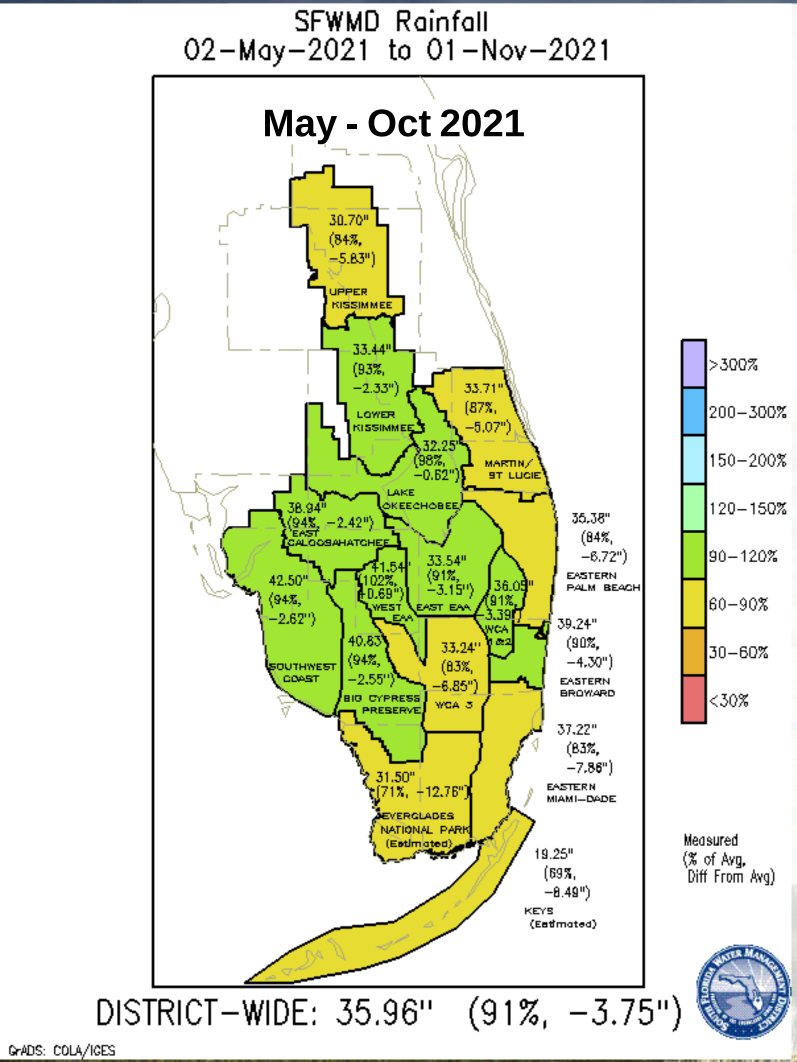


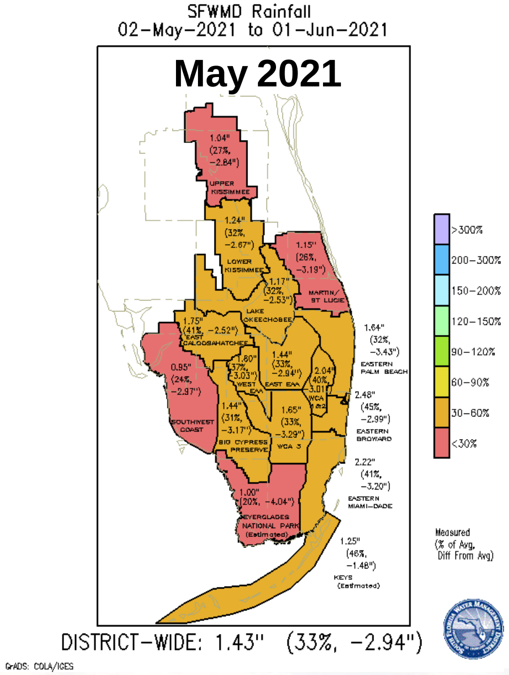


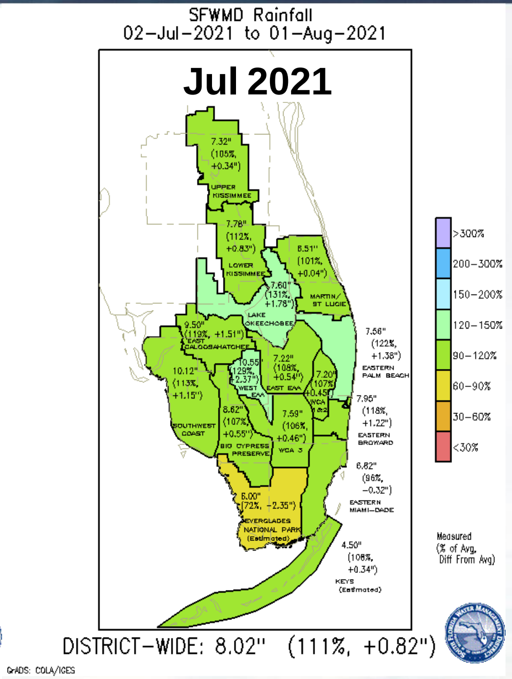


- Dry Season normal District-wide
- Dec 2020 extremely wet in EAA, C139, WCAs, ENP
- Jan 2021 extremely dry everywhere

Rainfall Wet Season Water Year 2022

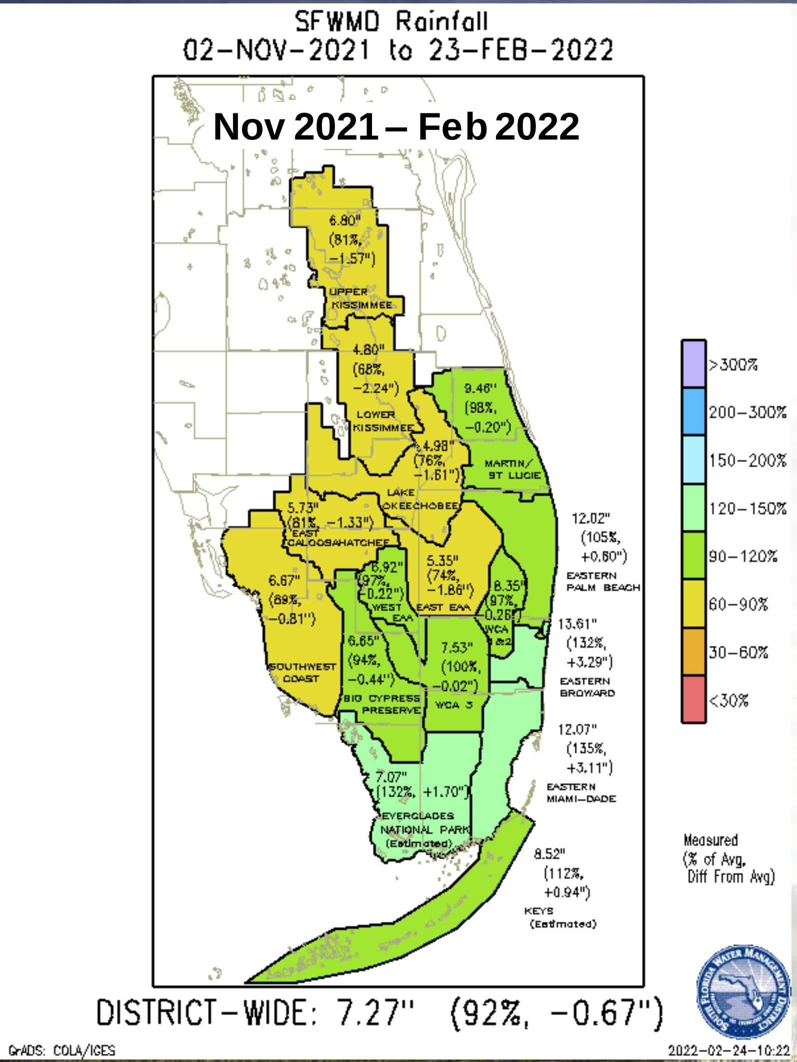


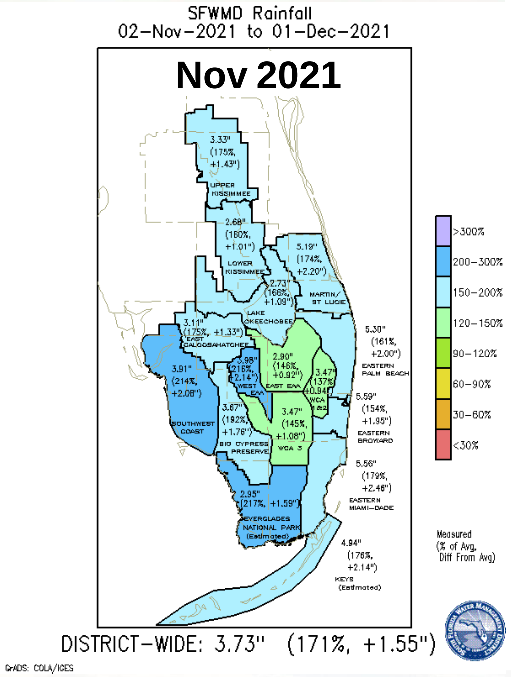


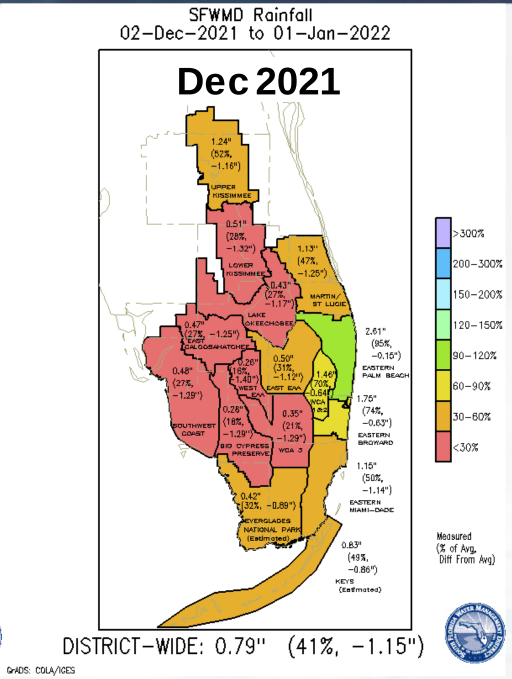


- Wet Season normal District-wide
- May 2021 extremely dry in Upper Kissimmee, ENP
- July 2021 wet in LO, C139, Eastern Palm Beach

Rainfall Dry Season Water Year 2022 (partial)



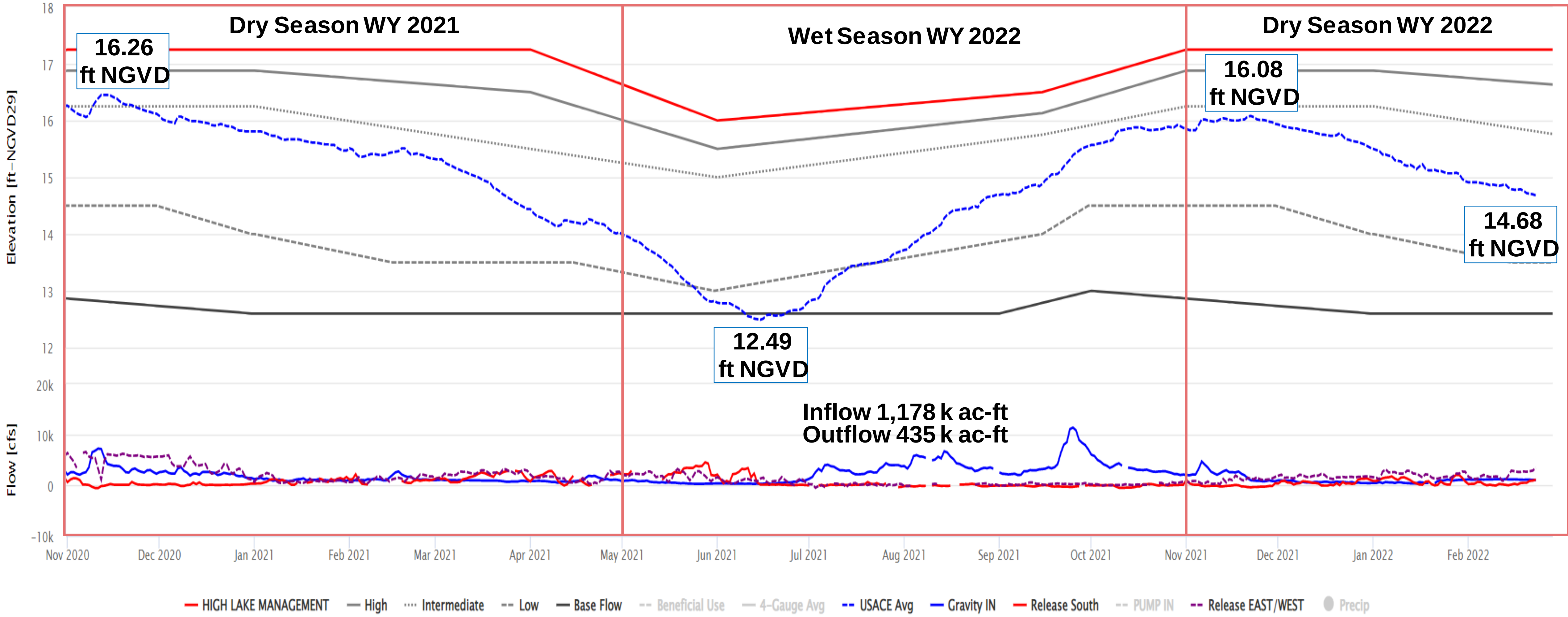




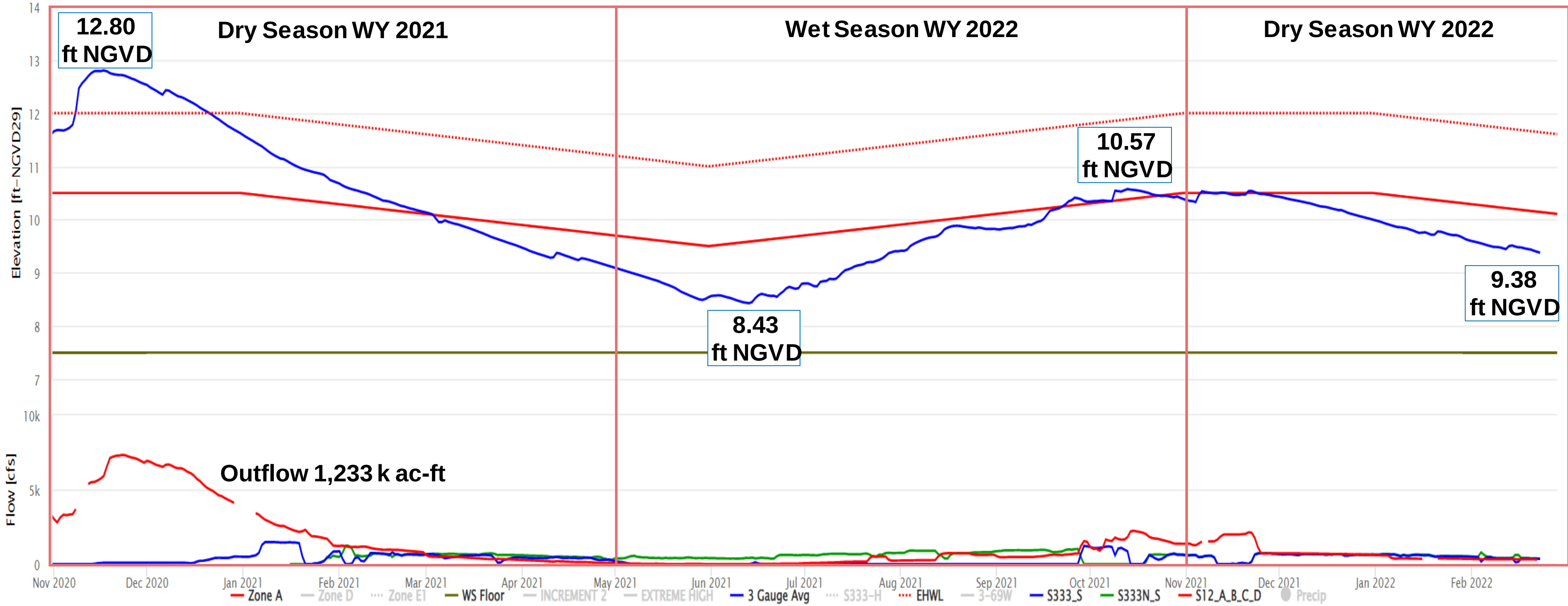
- Dry Season normal District-wide
- Nov 2021 very wet overall, extremely wet C139, ENP
- Dec 2021 extremely dry, especially LO, C139, WCA 3A

Presenter: Jose Otero

Lake Okeechobee Stage

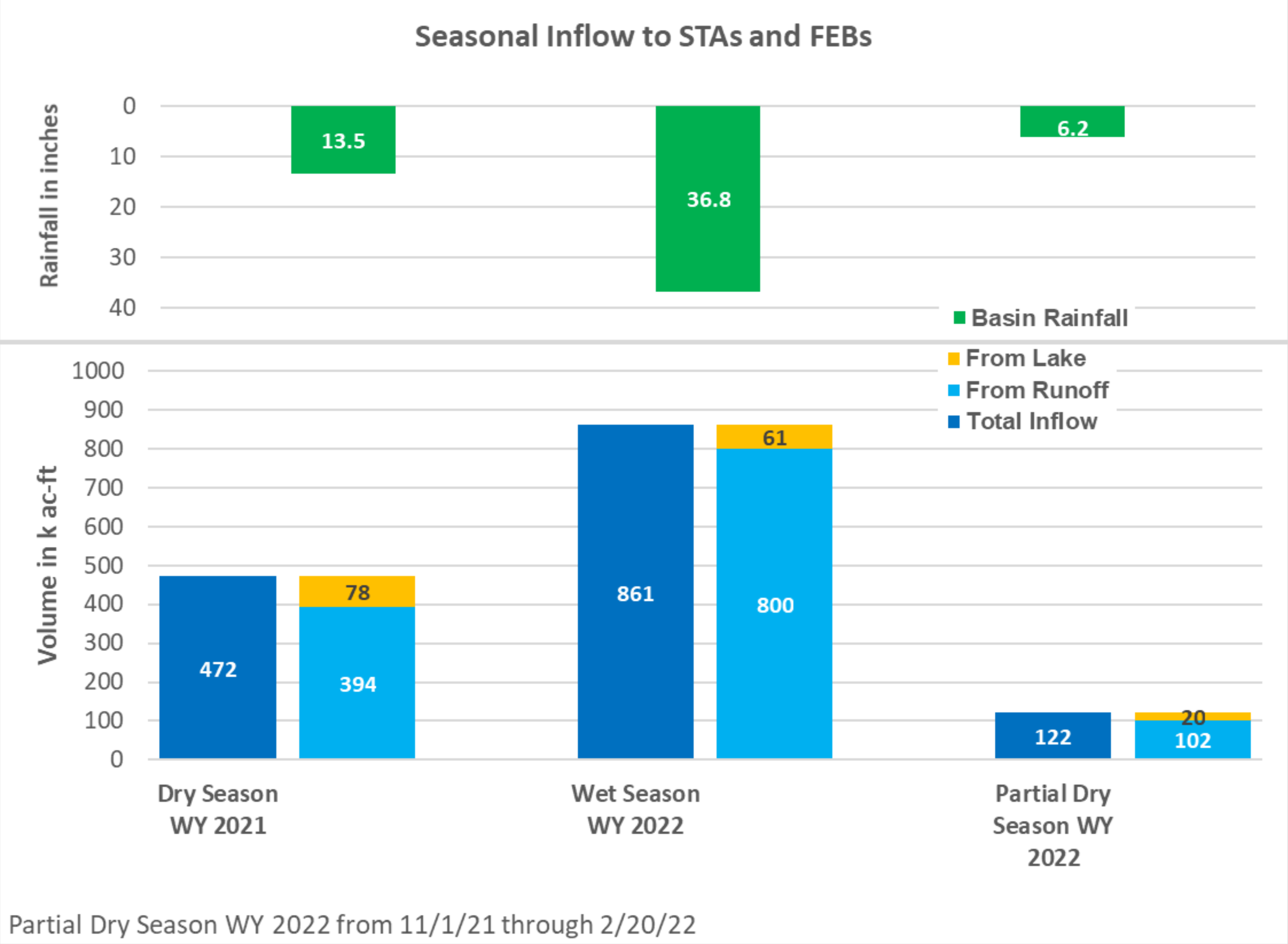


WCA 3A Stage

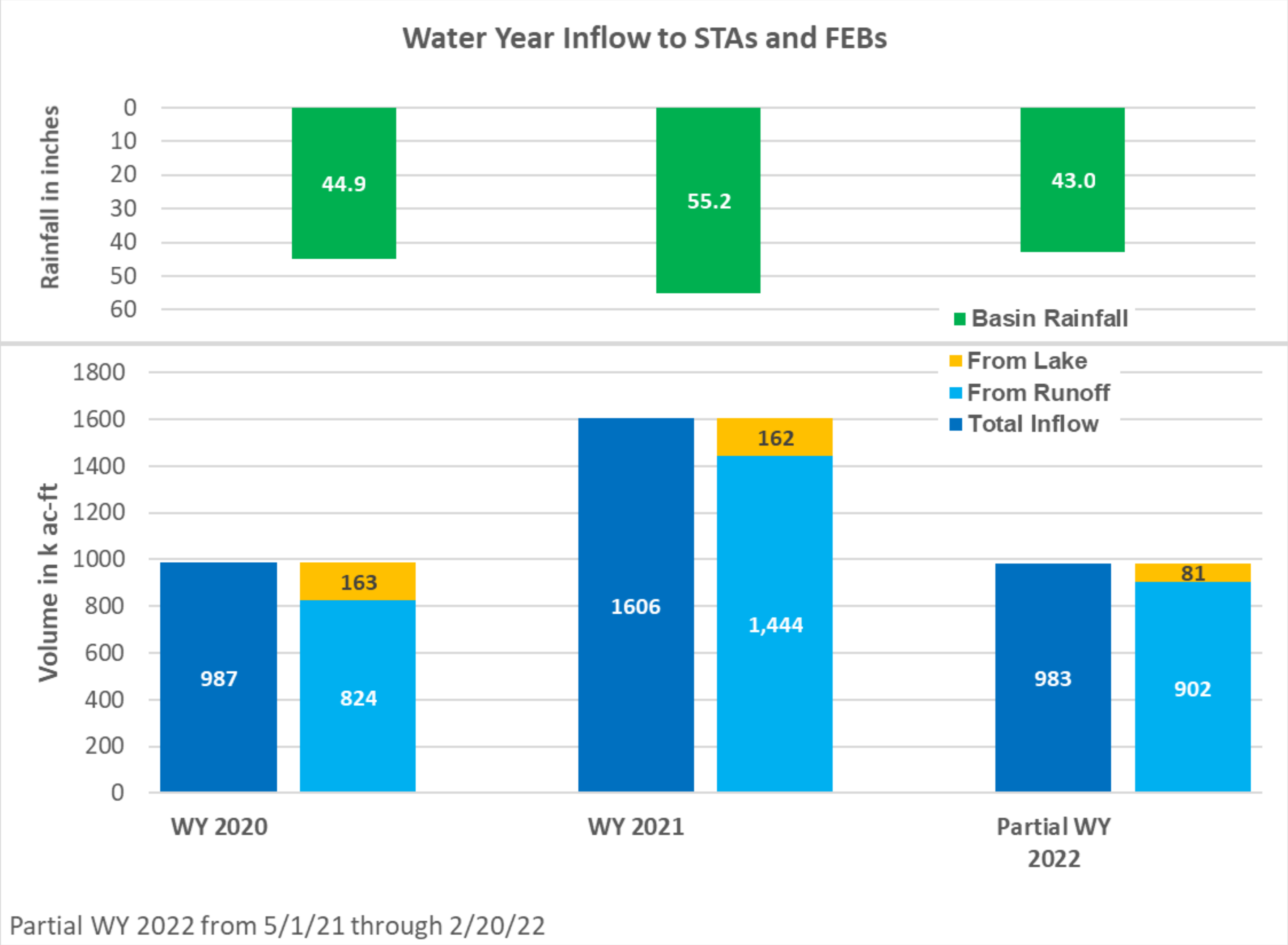


12.80 ft NGVD
Dry Season WY 2021
Wet Season WY 2022
Dry Season WY 2022
10.57 ft NGVD
8.43 ft NGVD
9.38 ft NGVD
Outflow 1,233 k ac-ft
Elevation [ft-NGVD29]
Flow [cfs]
14
13
12
11
10
9
8
7
10k
5k
0
Nov 2020
Dec 2020
Jan 2021
Feb 2021
Mar 2021
Apr 2021
May 2021
Jun 2021
Jul 2021
Aug 2021
Sep 2021
Oct 2021
Nov 2021
Dec 2021
Jan 2022
Feb 2022
Zone A
Zone D
Zone E1
WS Floor
INCREMENT 2
EXTREME HIGH
3 Gauge Avg
S333-H
EHWL
3-69W
S333_S
S333N_S
S12_A_B_C_D
Precip

Seasonal Inflows to STAs



Water Year Inflows to STAs



Contact Information

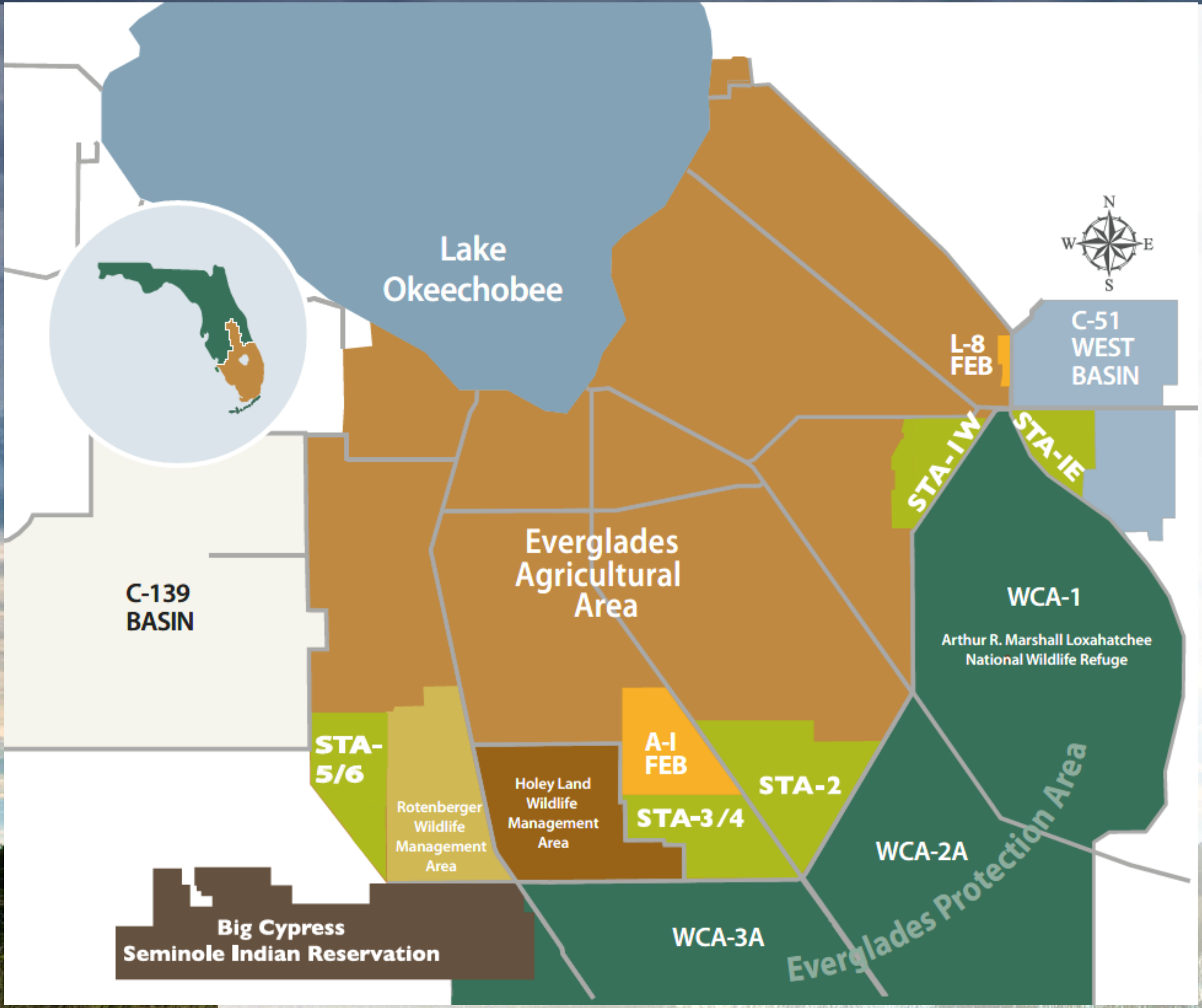
Jose Otero
jotero@sfwmd.gov

Everglades Stormwater Treatment Areas Performance Update

Jake Dombrowski
Senior Scientist
Applied Sciences
sfwmd.gov

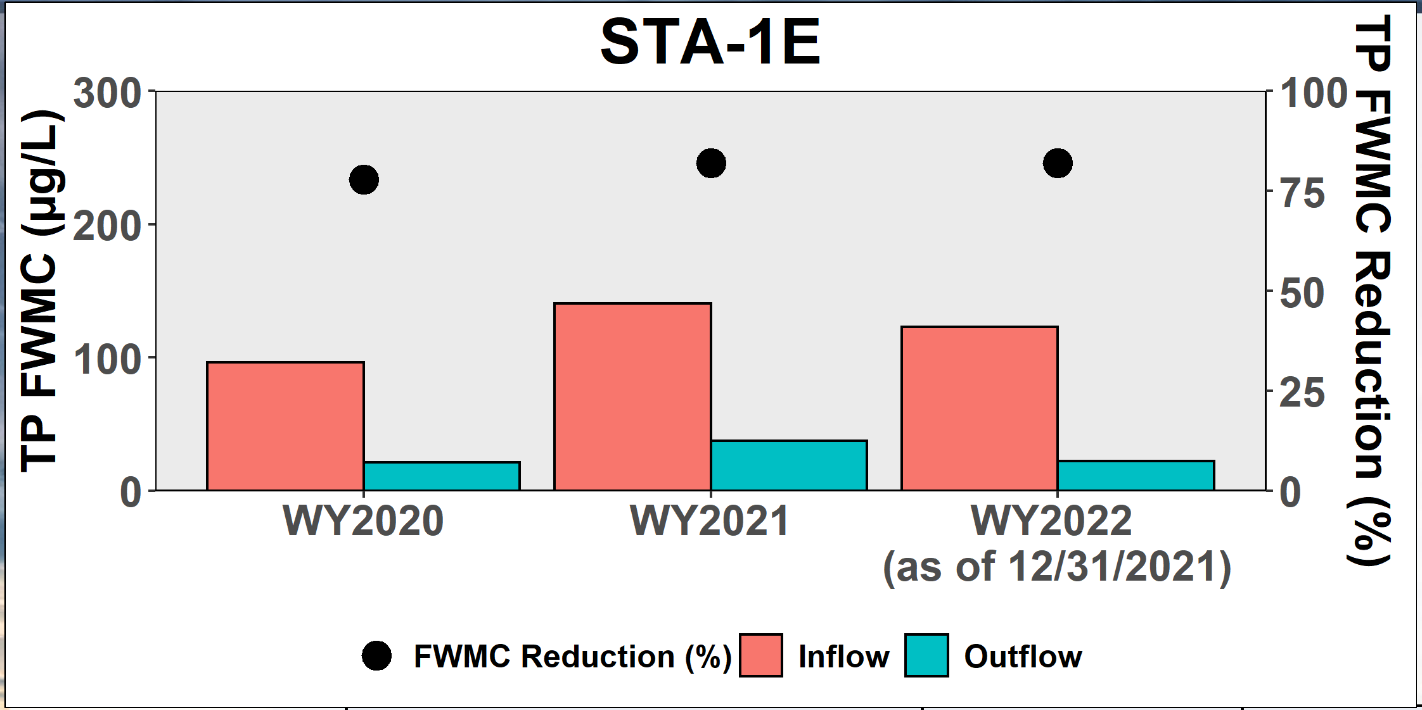
19th Annual Public Meeting on the Long-Term Plan for Achieving Water Quality Goals for the Everglades Protection Area Tributary Basins
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Introduction



- STA Performance
  - Flow volumes, TP loads and FWMC (Flow-weighted Mean Concentration)
- Yearly and monthly variation
- Construction and operational restrictions

STA-1E Performance Comparison by WY



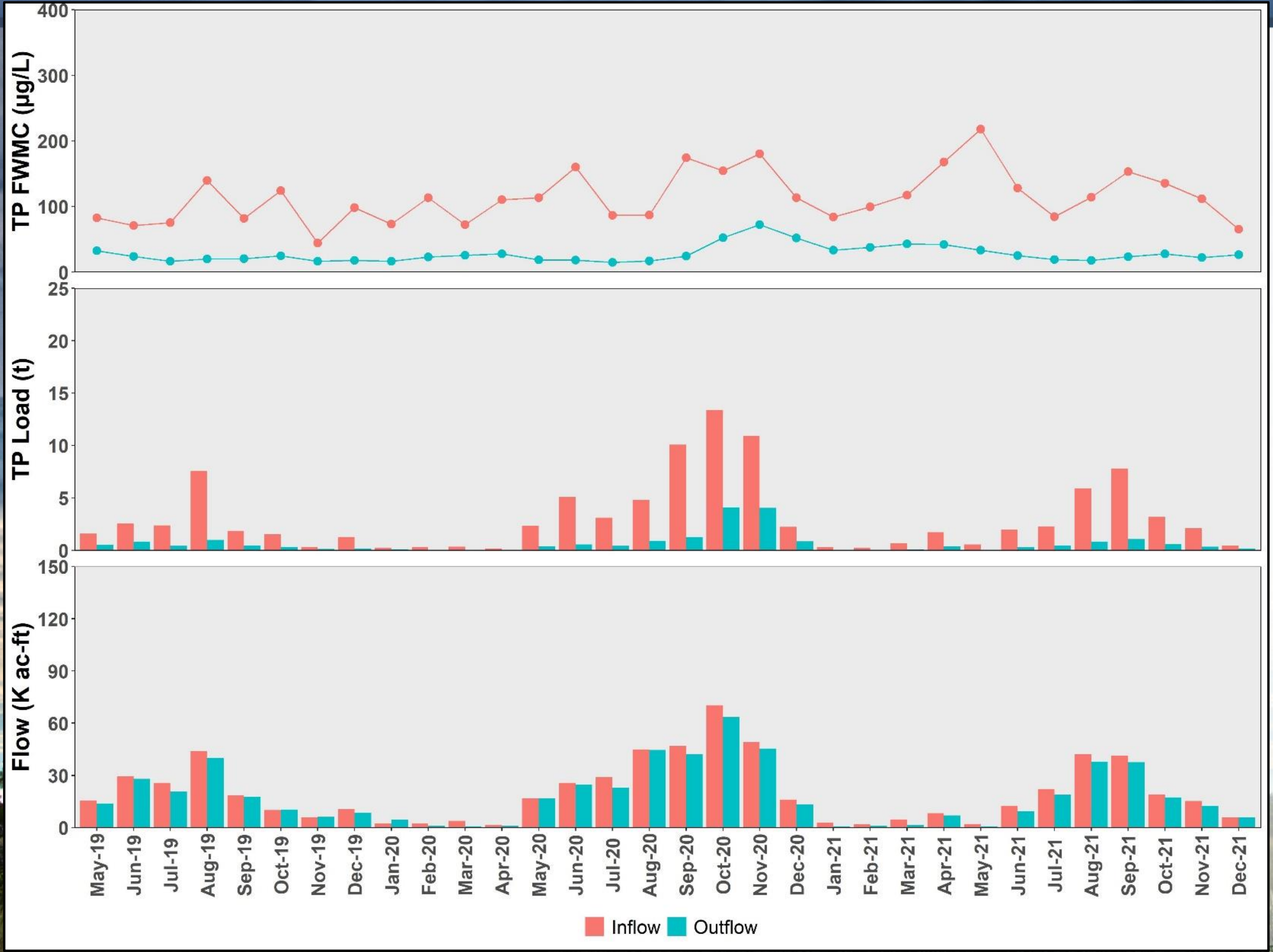

Cell 4S Submerged Vegetation (T. Adeagbo)

	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	170	316	160
Lake releases (k acre-feet)	12	25	3
TP FWMC inflow / outflow (µg/L)	96 / 21	141 / 37	123 / 22
TP load inflow / outflow (tons)	20 / 4	55 / 13	24 / 4
Reduction in TP FWMC / load	78% / 80%	82% / 84%	82% / 84%

Includes preliminary data

Presenter: Jake Dombrowski

STA-1E Monthly Inflows and Outflows



- Elevated flows, TP loads, FWMC during WY2021
- Generally stable outflow TP FWMC
  - Elevated prior to and following Tropical Storm Eta (WY2021)

Includes preliminary data

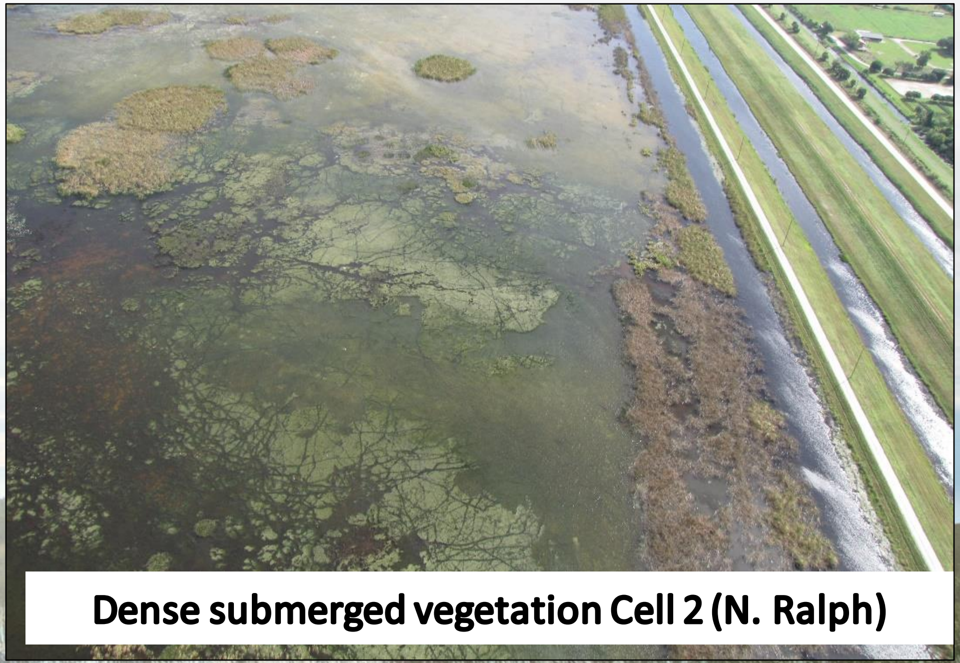
STA-1E Operational Restrictions

(Jan. 1, 2021 – Dec. 31, 2021)

- Western Flow-way offline
  - WDC levee repairs, Restoration Strategies earthwork project in Cells 5 and 7, refurbishment project in Cell 6
- Periodic restrictions in Central Flow-way for vegetation management

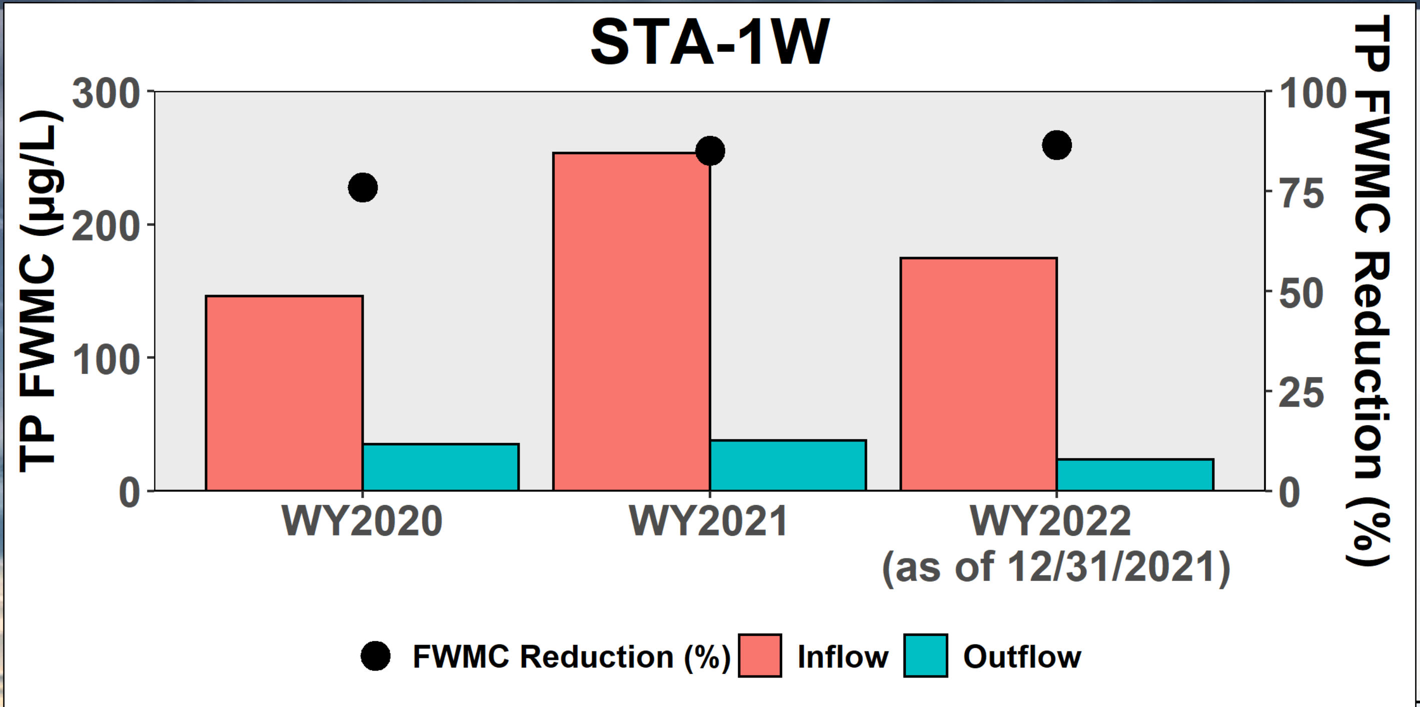


Cell 5 and 7 earthwork near completion (N. Ralph)



Dense submerged vegetation Cell 2 (N. Ralph)

STA-1W Performance Comparison by WY



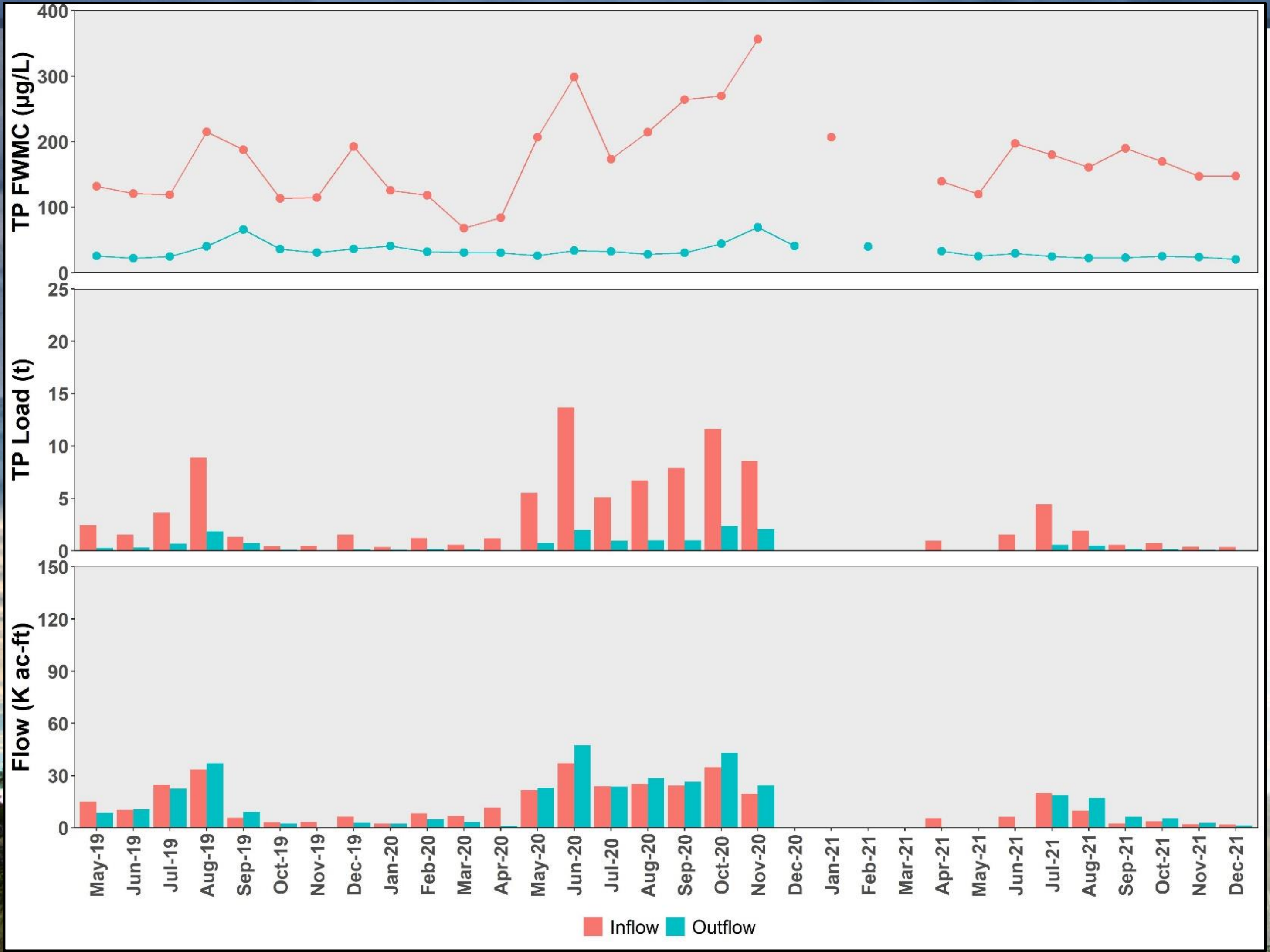


Expansion 1 (T. Adeagbo)

	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	130	192	46
Lake releases (k acre-feet)	17	8	2
TP FWMC inflow / outflow (µg/L)	146 / 35	254 / 38	175 / 24
TP load inflow / outflow (tons)	23 / 5	60 / 10	10 / 2
Reduction in TP FWMC / load	76% / 81%	85% / 83%	87% / 85%

Includes preliminary data

STA-1W Monthly Inflows and Outflows



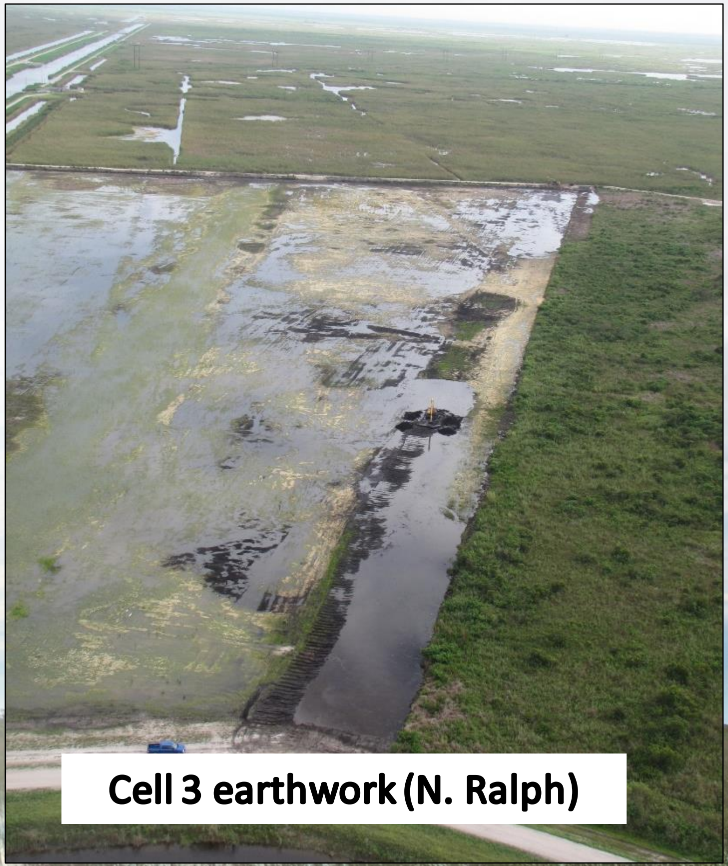
- Elevated inflow TP loads and FWMC during WY2021
- Outflow TP FWMC remains relatively low and stable
  - Slightly elevated following Tropical Storm Eta

Includes preliminary data

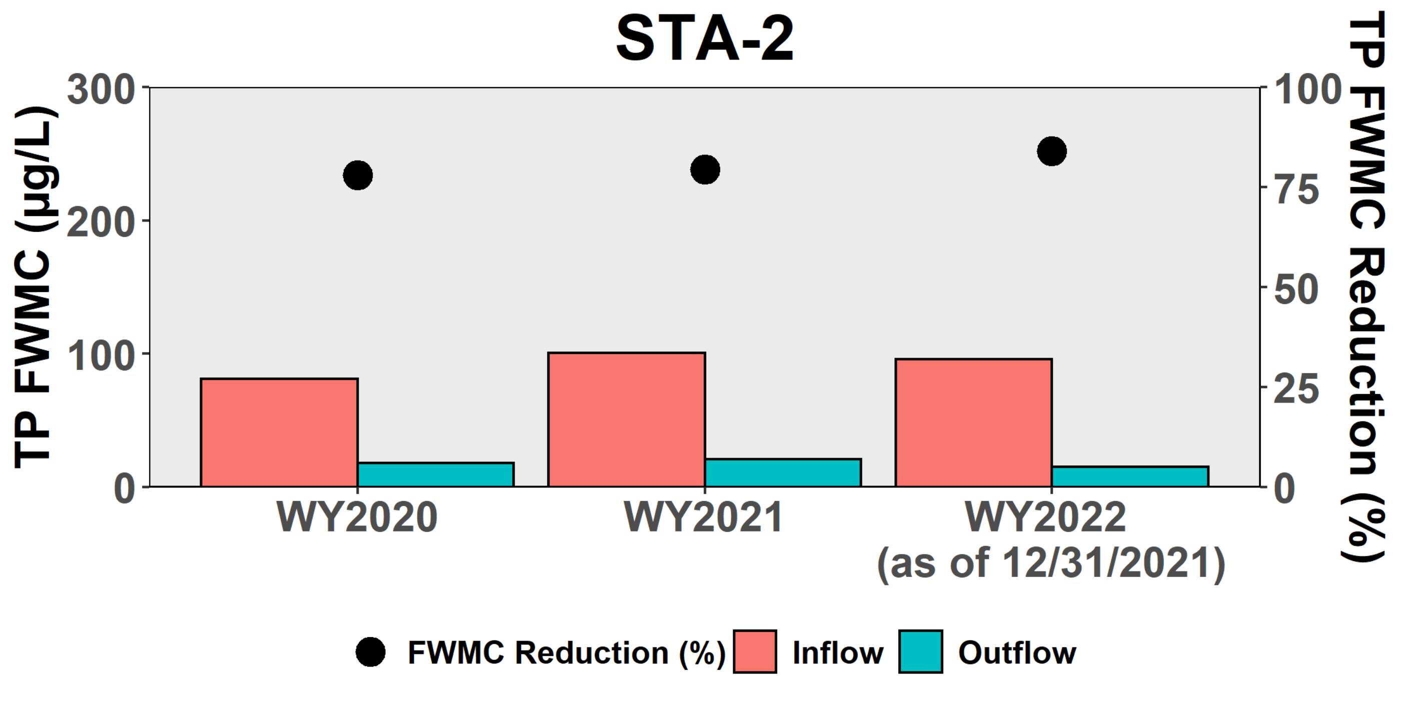
STA-1W Operational Restrictions
(Jan. 1, 2021 – Dec. 31, 2021)

- Periodic restrictions in all flow-ways
  - Refurbishment earthwork projects in Northern, Western, and Eastern Flow-ways
  - Construction related to STA-1W Expansion #2 in Cell 8
  - Black-necked stilts nested in all flow-ways


Black necked stilt nesting (B. Garrett)


Cell 3 earthwork (N. Ralph)

STA-2 Performance Comparison by WY



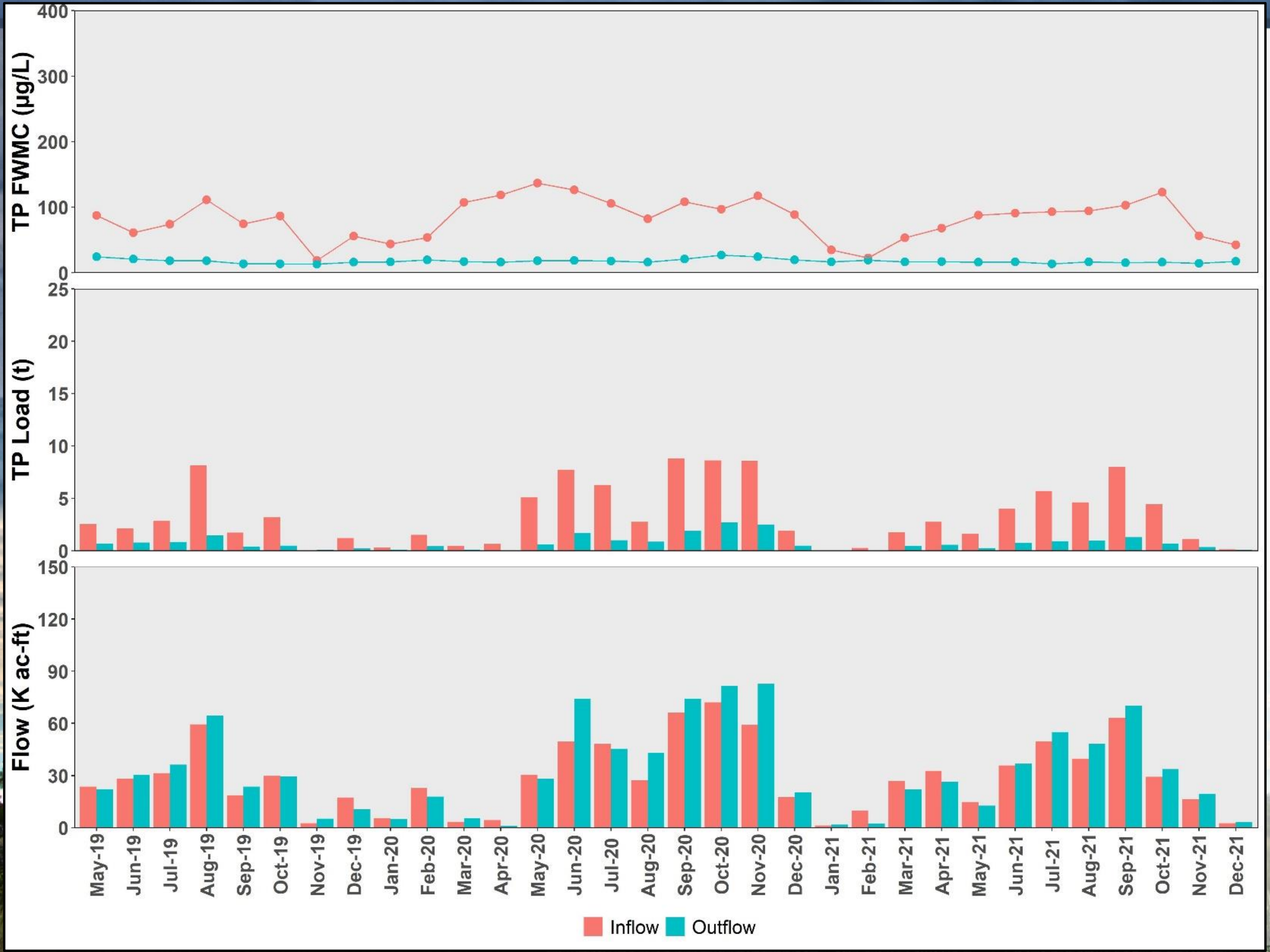


STA-2 Cell 3 (T. Adeagbo)

	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	247	441	251
Lake releases (k acre-feet)	37	72	21
TP FWMC inflow / outflow (µg/L)	81 / 18	100 / 21	96 / 15
TP load inflow / outflow (tons)	25 / 6	55 / 13	30 / 5
Reduction in TP FWMC / load	78% / 78%	79% / 76%	84% / 82%

Includes preliminary data

STA-2 Monthly Inflows and Outflows



- Elevated flows and TP loads during WY2021
- Outflow TP FWMC remains low and stable

Includes preliminary data

STA-2 Operational Restrictions
(Jan. 1, 2021 – Dec. 31, 2021)

- Flow-way 2 offline for earthwork project
- Periodic restrictions in all flow-ways
  - Flow-way 3 construction project
  - Vegetation management activities

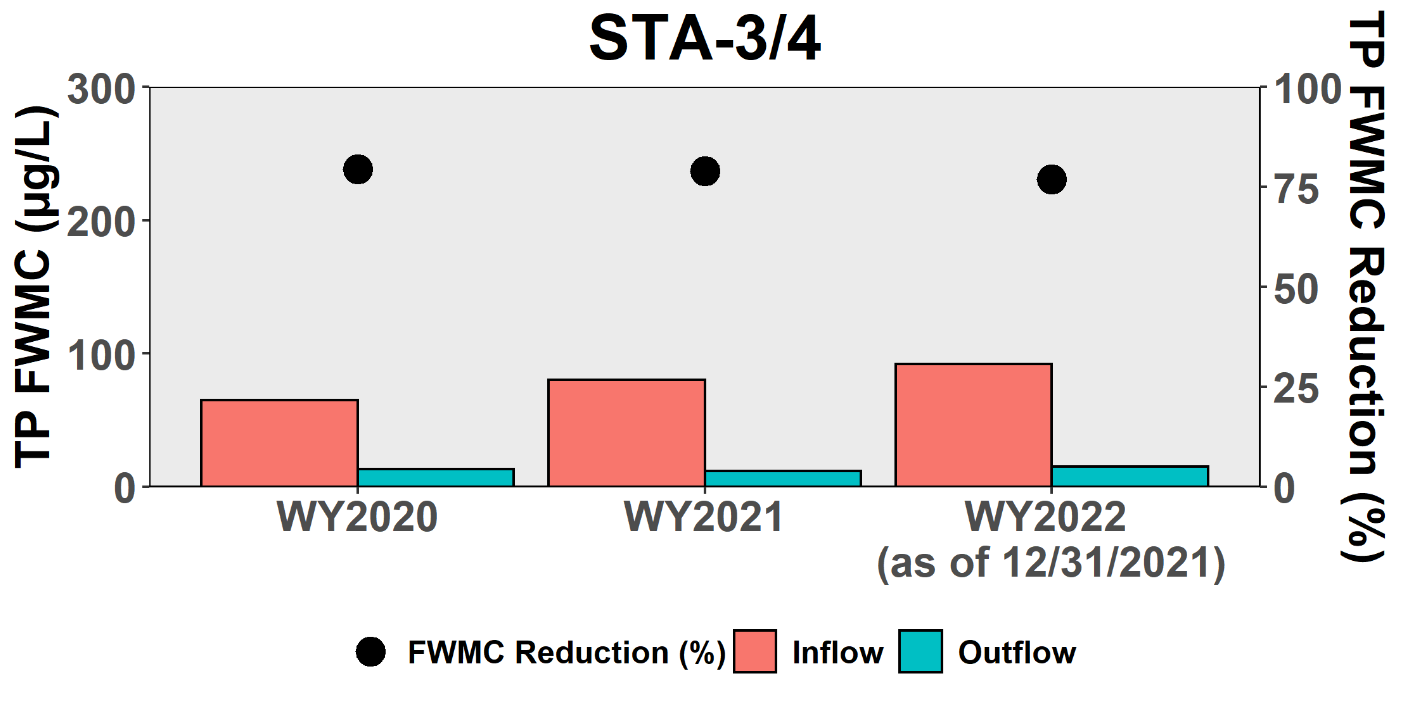


Least Terns nesting with chick (B. Garrett)



Cell 3 remnant road cuts (N. Ralph)

STA-3/4 Performance Comparison by WY



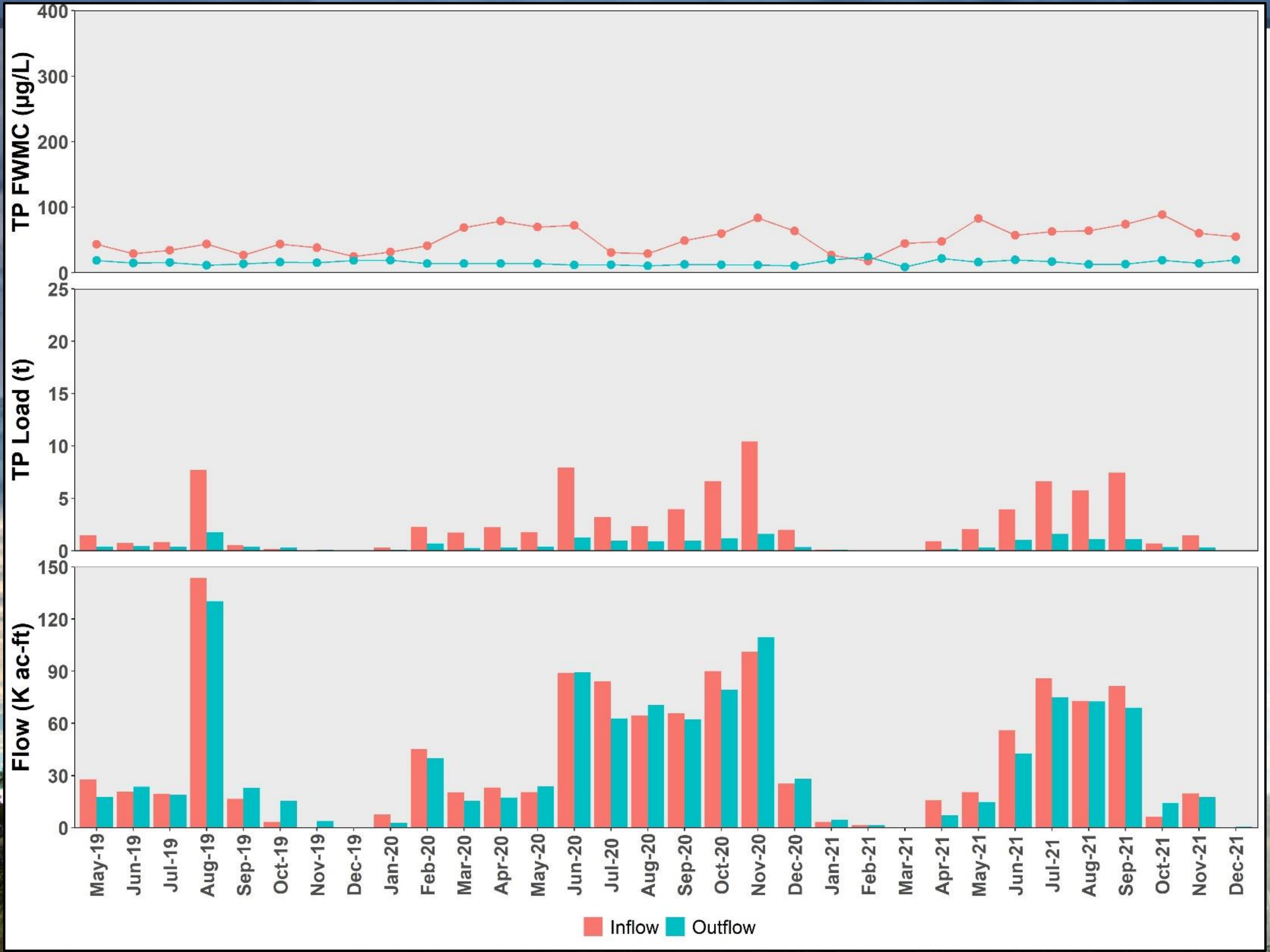


STA-3/4 Mixed Marsh (T. Adeagbo)

	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	311	521	321
Lake releases (k acre-feet)	56	42	30
TP FWMC inflow / outflow (µg/L)	65 / 13	80 / 12	92 / 15
TP load inflow / outflow (tons)	25 / 5	51 / 8	36 / 6
Reduction in TP FWMC / load	80% / 80%	79% / 80%	77% / 79%

Includes preliminary data

STA-3/4 Monthly Inflows and Outflows



- Compared to other STAs, less variability in inflow TP loads due to A-1 FEB
  - Slightly elevated following Tropical Storm Eta
- Outflow TP FWMC remains low and stable

Includes preliminary data

STA-3/4 Operational Restrictions
(Jan. 1, 2021 – Dec. 31, 2021)

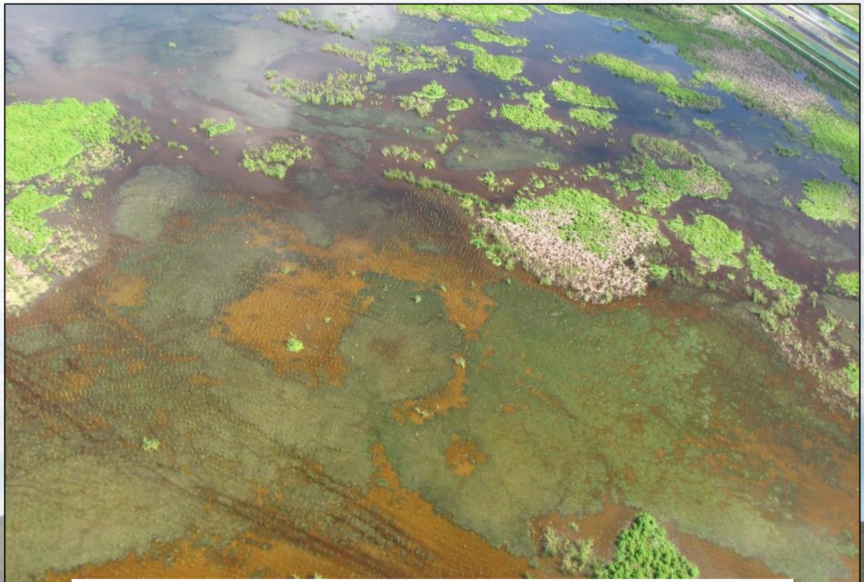
- Eastern Flow-way offline for vegetation rehabilitation/drawdown
- Periodic restrictions for vegetation management activities



Snail Kite near A-1 FEB (B. Garrett)

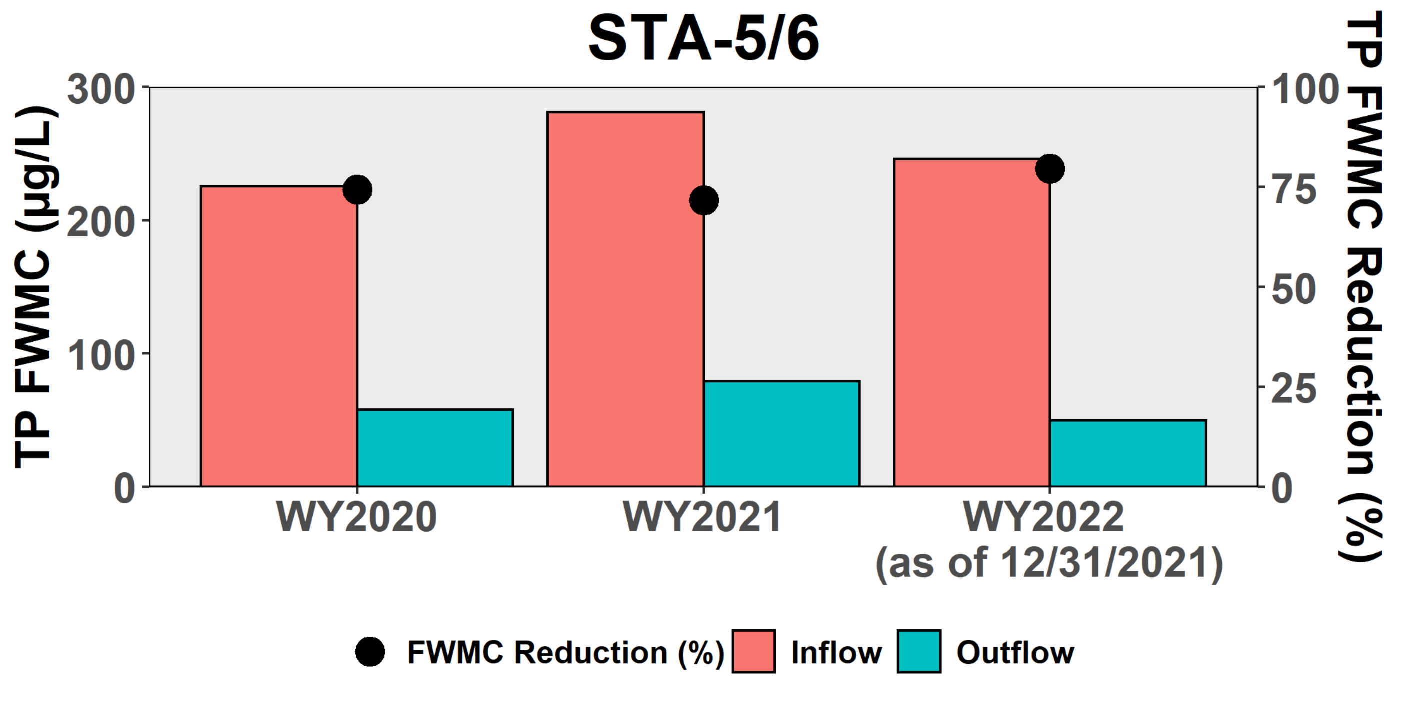


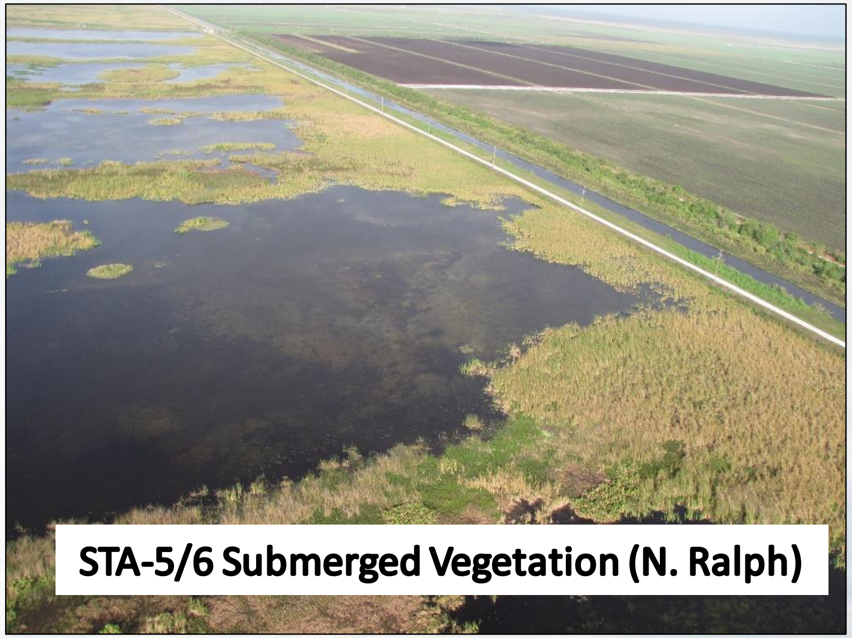
Mixed marsh Cell 2B (J. Wilson)



Cell 1A drawdown/plantings (N. Ralph)

STA-5/6 Performance Comparison by WY



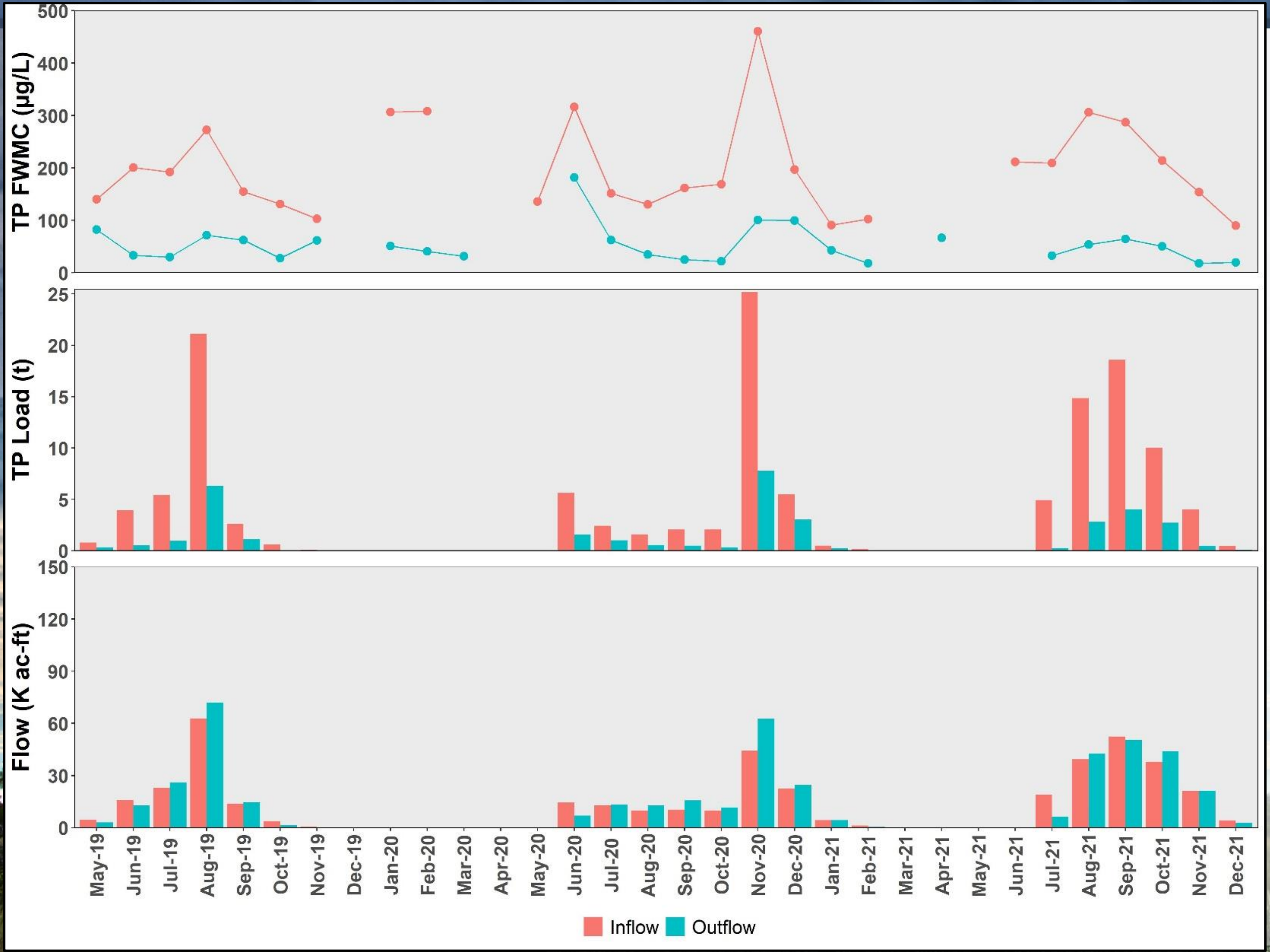


STA-5/6 Submerged Vegetation (N. Ralph)

	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	124	130	174
TP FWMC inflow / outflow (µg/L)	226 / 58	281 / 79	246 / 50
TP load inflow / outflow (tons)	35 / 9	45 / 15	53 / 10
Reduction in TP FWMC / load	74% / 73%	72% / 67%	80% / 80%

Includes preliminary data

STA-5/6 Monthly Inflows and Outflows

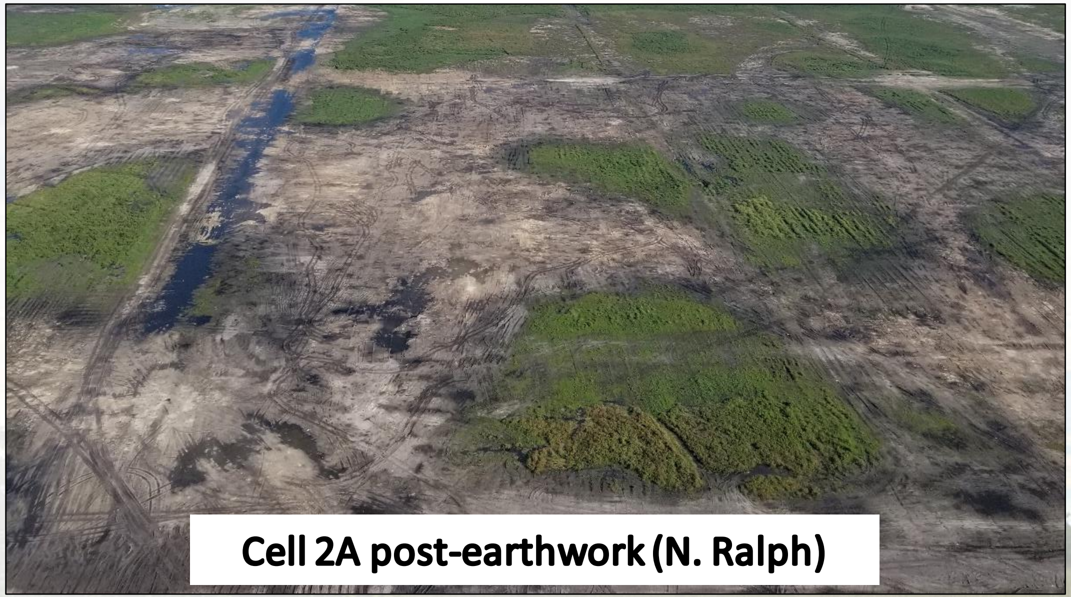


- Inflow TP load spike due to storm events in August 2019 and November 2020
- Frequent dry-out conditions during the dry seasons
- Elevated inflow/outflow TP FWMC following dry-out

Includes preliminary data

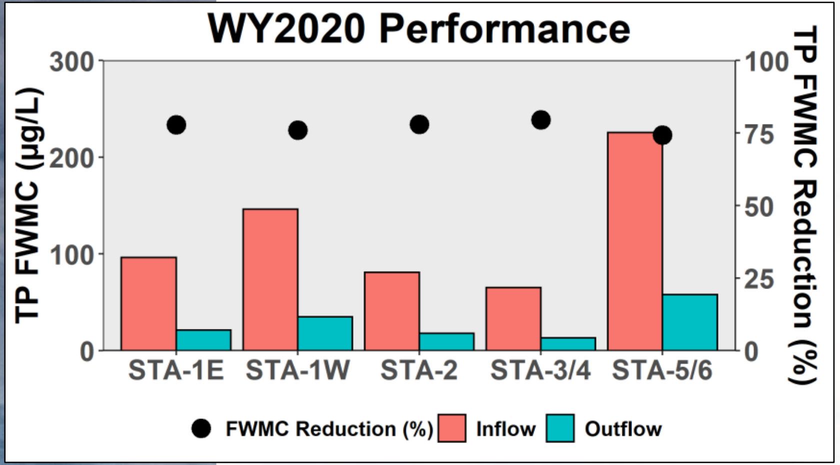
STA-5/6 Operational Restrictions
(Jan. 1, 2021 – Dec. 31, 2021)

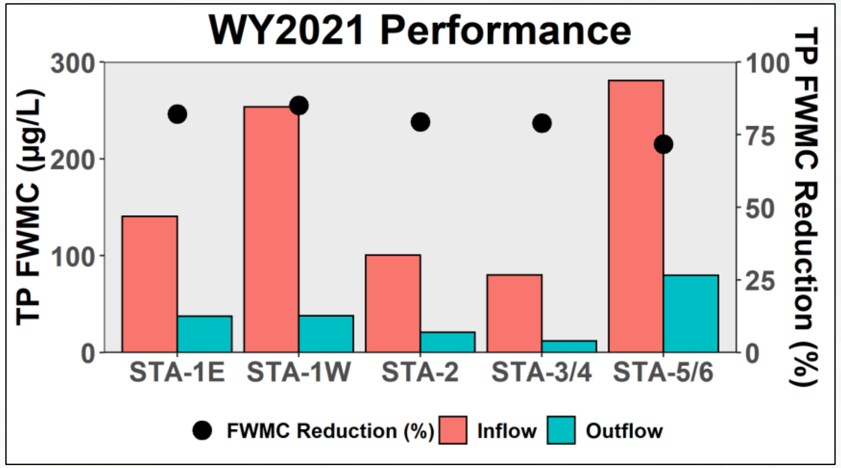
- Periodic restrictions
  - Post-Restoration Strategies earthwork project in Flow-ways 2 and 3
  - Black-necked stilts nested in Flow-ways 3 and 6

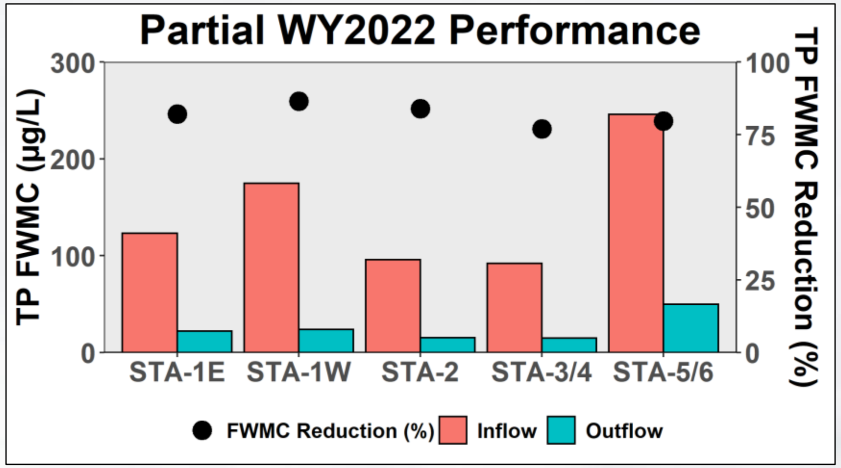

Cell 2A post-earthwork (N. Ralph)


Cell 1B SAV coverage (J. Wilson)

All STAs Performance Comparison by WY







	WY2020	WY2021	Partial WY2022 (05/01/2021 - 12/31/2021)
Total inflow (k acre-feet)	987	1606	953
Lake releases (k acre-feet)	163	162	66
TP FWMC inflow / outflow (µg/L)	105 / 24	134 / 28	130 / 23
TP load inflow / outflow (tons)	128 / 28	266 / 59	153 / 27
Reduction in TP FWMC / load	77% / 78%	79% / 78%	82% / 83%

Includes preliminary data

Contact Information

Jake Dombrowski
jdombrow@sfwmd.gov



Vegetation Management

Eric Crawford
Senior Scientist
Land Resources
sfwmd.gov

19th Annual Public Meeting on the Long-term Plan for Achieving Water Quality Goals for the Everglades Protection Areas Tributary Basins

February 28, 2022

Objective



Maintain sustainable vegetation-based phosphorus uptake processes

Vegetation Enhancement
- Establish/maintain appropriate vegetation communities
- Improve stability and functional redundancy

Selective Management
- Increase desirable species
- Control Invasive/Undesirable species
- Control exotic populations

STA Vegetation Function


Emergent plantings after cattail failure


SAV harvest and transport

Emergent Aquatic Vegetation (EAV)

- Stabilize soils
- Create beneficial Flow Patterns
- Decrease Turbidity
- Create litter

Submerged Aquatic Vegetation (SAV)

- Water column nutrient uptake
- Provide Periphyton Substrate

Healthy EAV



Highly Stressed EAV



STA Vegetation

Desirable Plants

A healthy mix of Emergent vegetation, dominated by Cattail and bulrush, and a mix of Submerged vegetation dominated by southern naiad, spiny naiad and Chara



Undesirable Plants

Nuisance vegetation dominated by floating mats of cattail and primrose willow, plants growing on floating delaminated soils



Invasive Species Control

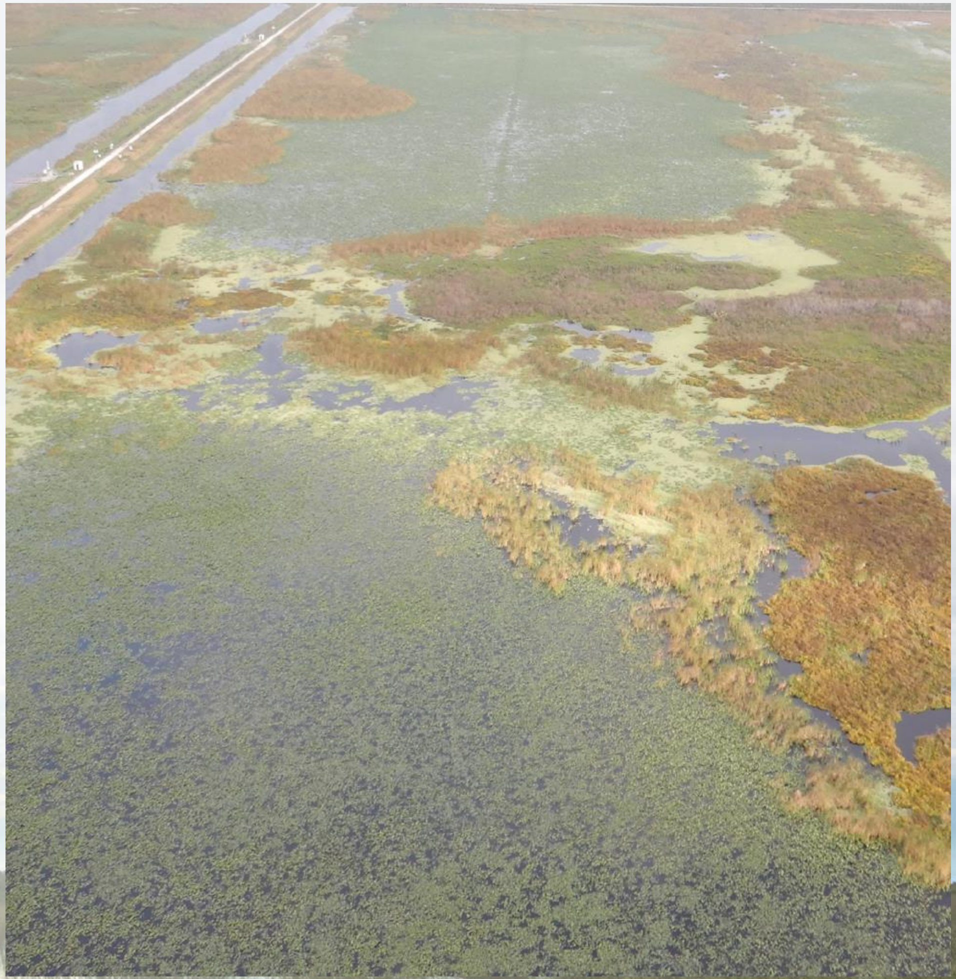
- Herbicide applications and mechanical control measures
- Dense native vegetation plantings can be made after treatments to interfere with the spread of invasive plants
- District staff have identified several native species to use in varying conditions to maximize resiliency and performance



FAV Control

Dense vegetation strips at the inflows can reduce FAV Inflow strips can be shaped to trap and concentrate FAV entering a cell decreasing herbicide use in the cells and reducing costs

Repairing damage and short circuits can minimize FAV penetration into the cells



Adaptive Management Process

Monitor Vegetation Health

Coordinate with water management

Stage, flow rates (cfs), redirecting flow

Proactively Manage Vegetation

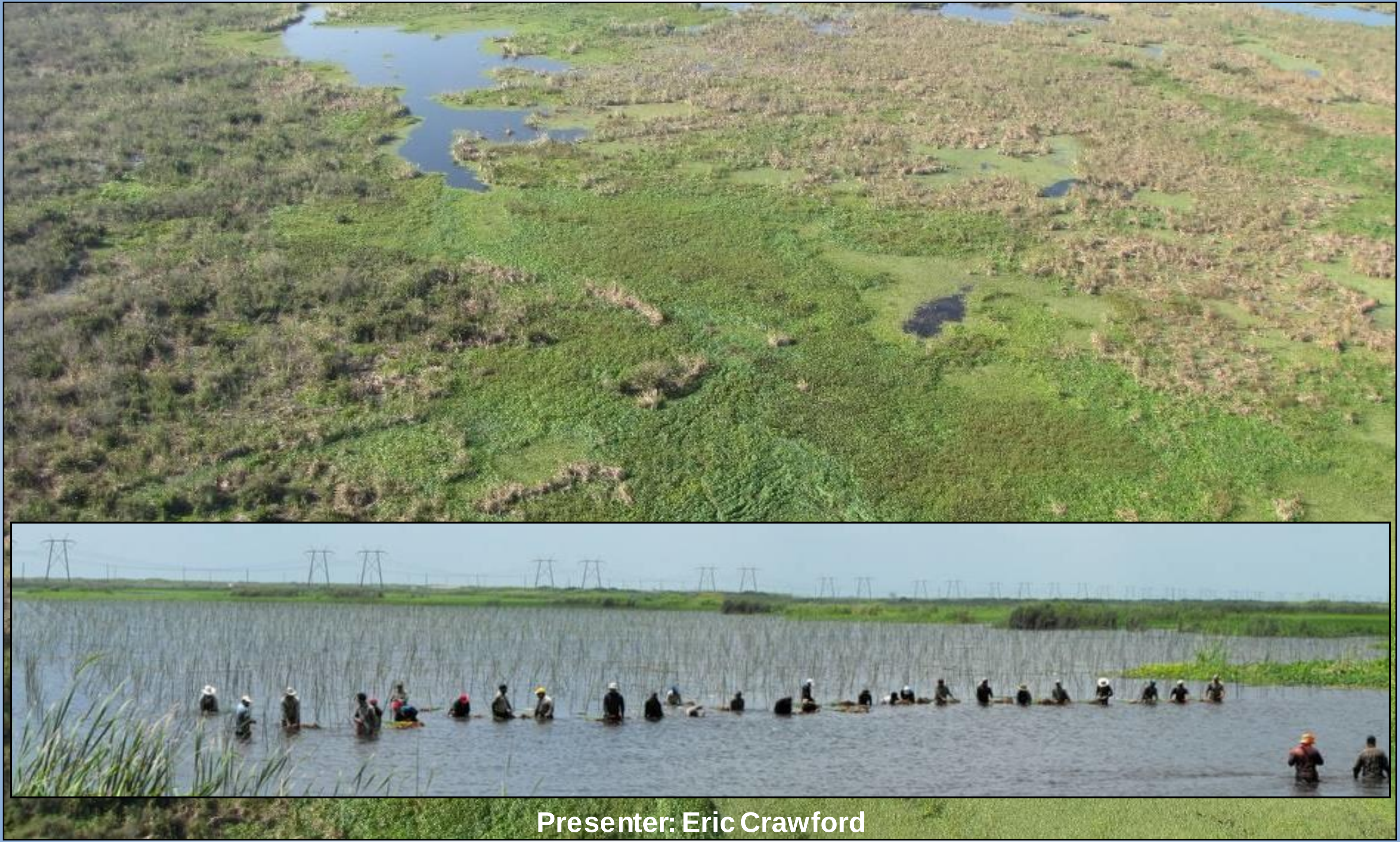
Increase cover and health of desired species where needed to adjust flows or stabilize soils

Control Undesirable Species

Repair and Restore

Emergent vegetation enhancements where vegetation is damaged or undesirable

Rehabilitation: Emergent Plants



Presenter: Eric Crawford

Rehabilitation: Emergent Plants
STA 3-4 Cell 1A



STA 3/4 Cell 1A

Damage and degradation moving downstream through the cell as short circuits form, FAV is pushed south, eventually leading to soil delamination and floating cattails and invasive plants.

The time-lapse illustrates the process, and the rehabilitation work under way to treat the invasive species in the front end, strengthen the cattail in the southern portion of the cell and establish desirable vegetation in the central slough.



Rehabilitation: SAV Inoculation





SAV harvest and transport

Presenter: Eric Crawford

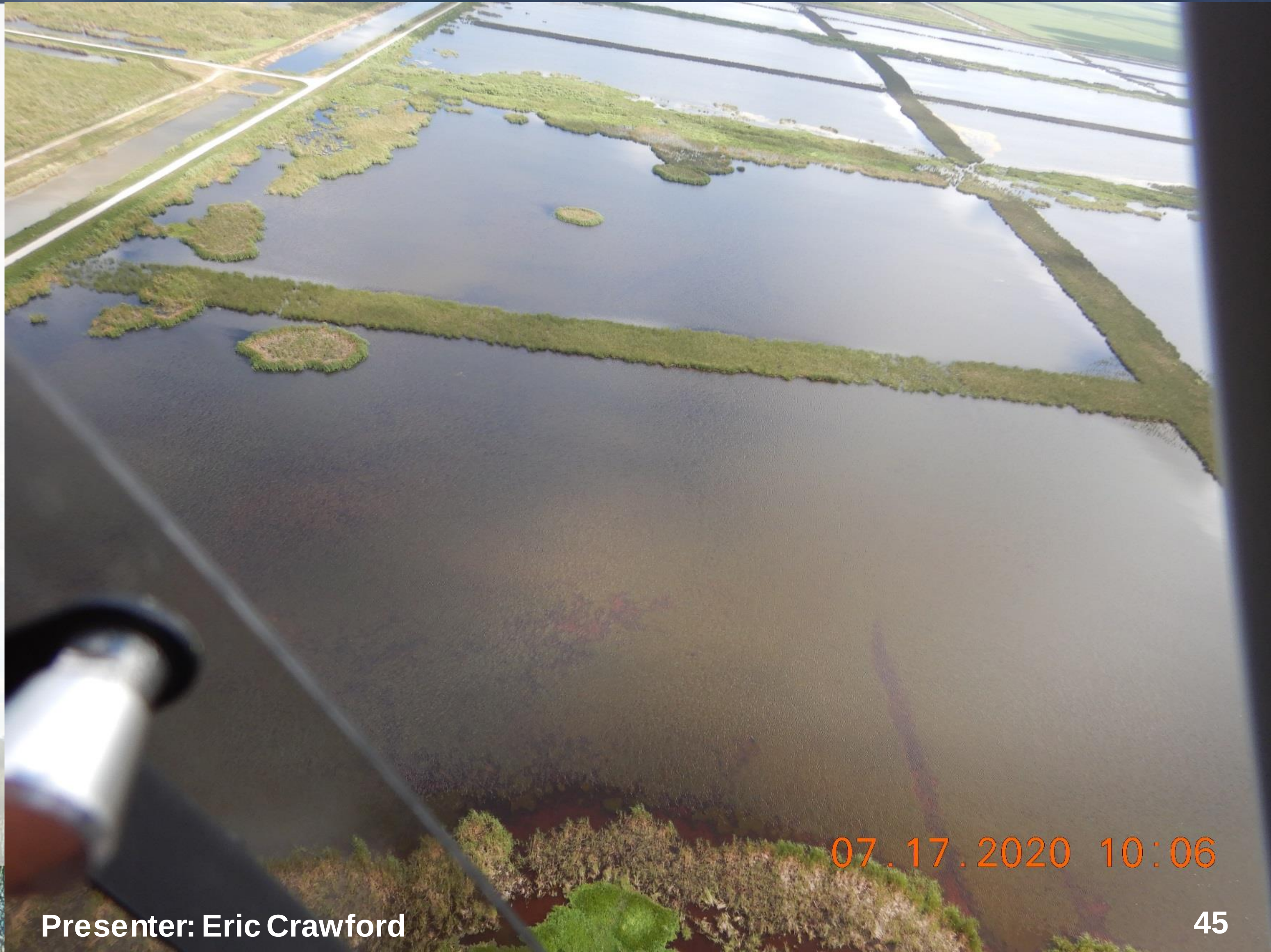
SAV Management in STA Operations



- Compartmentalizing the SAV cells with vegetation strips can help protect and stabilize SAV populations
- Smaller, more diverse and compartmentalized SAV beds can be more resistant to short circuiting, disturbance, storm events and seem better at resisting colonization by exotic species.
- EAV provides structure, protection, and litter to assist with nutrient uptake

Repair and Restoration of STA 2 Cell 3

- Over ten miles of emergent vegetation strips planted to protect and compartmentalize the Cell prior to SAV restoration
- Multiple short circuits and scoured out boat trails filled and planted
- SAV was planted and enhancements continue throughout the cell.



Presenter: Eric Crawford

STA2 Cell 3

Timeline Jan 2017-Feb 2011

This graphic illustrates the short circuiting, wave action, and turbidity that we believe contributed to the collapse of the SAV. The addition of new vegetation strips further compartmentalizing the cell can be seen, as well as the return of the SAV



Contact Information

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SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Status of Restoration Strategies Science Plan Studies

R. Thomas James
Principal Scientist
Applied Sciences
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Everglades National Park

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Acknowledgements





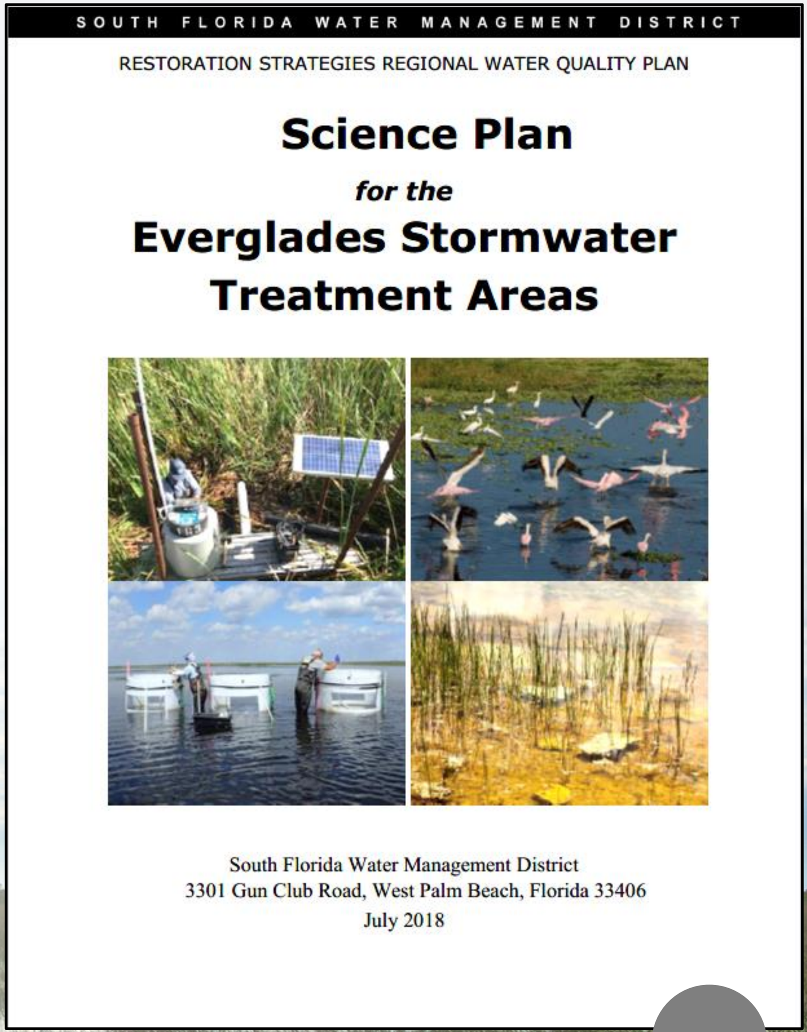






The Science Plan

- Developed in 2013 and updated in 2018
- Specified in Restoration Strategies and required by STA permits and consent orders
- Framework for 21 studies (8 completed, 13 ongoing)
  - Evaluate key factors and processes that affect phosphorus (P) removal in the STAs
  - Support design, operation & management of STAs to achieve Water Quality-Based Effluent Limits (WQBEL)


SOUTH FLORIDA WATER MANAGEMENT DISTRICT

RESTORATION STRATEGIES REGIONAL WATER QUALITY PLAN

Science Plan

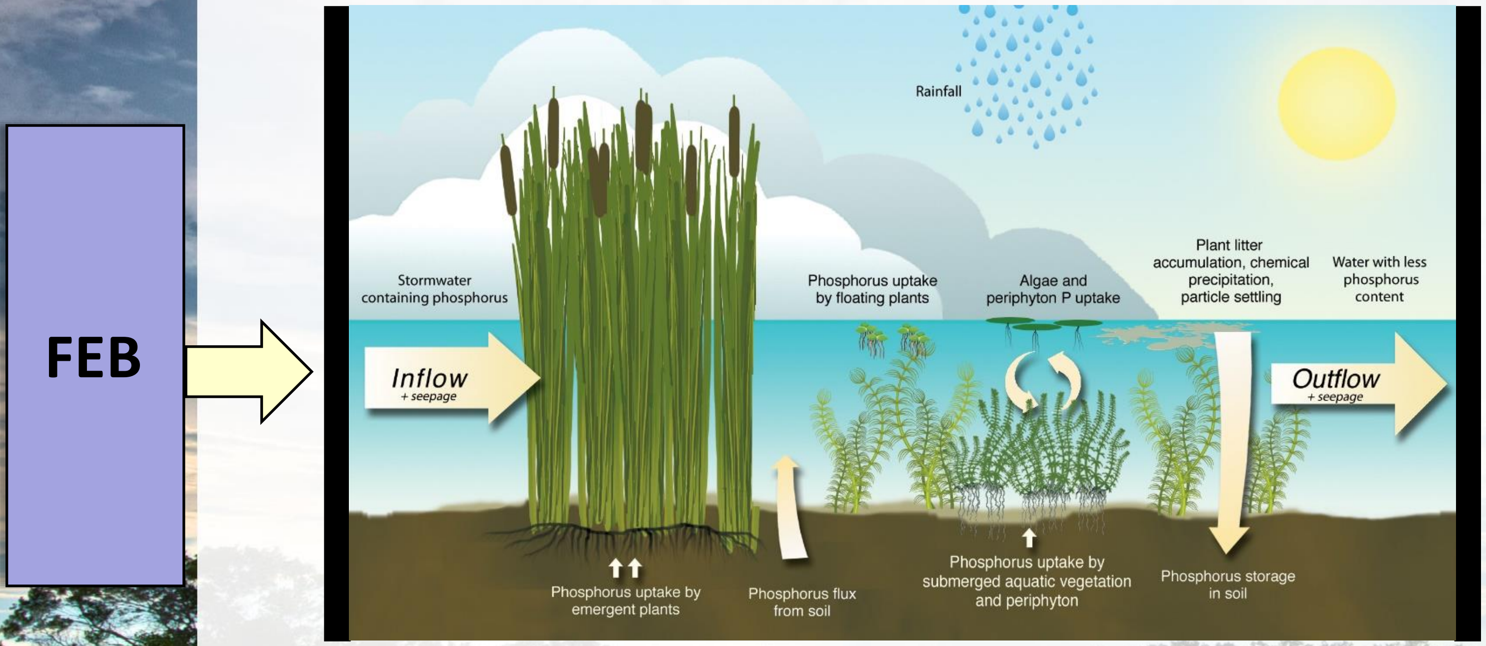
for the

Everglades Stormwater Treatment Areas

South Florida Water Management District
3301 Gun Club Road, West Palm Beach, Florida 33406
July 2018

Areas of Investigation

6 Key questions and 18 sub-questions on these topics



1. Design and operation of FEBs
2. Design and operation of STAs
3. Vegetation improvement
4. Internal loading of P
5. Biogeochemical and physical mechanisms
6. Role of fauna

Studies Completed

Study Title	Major Findings
Development of Operational Guidance for Flow Equalization Basin (FEB) and STA Regional Operation (Operation Study)	• Developed relationships of flow, slope and resistance • Supports STA operations • Developed iModel for Restoration Strategies Operational Protocol • FEB operations can be optimized to meet the WQBEL
Influence of Canal Conveyance Features on STA and FEB Inflow and Outflow P Concentrations (Canal Study)	• Total P (TP) Export related to high flow events and increase of particulate P • Use of FEBs to reduced peak flow should reduce TP export
Investigation of STA-3/4 Periphyton-based Stormwater Treatment Area (PSTA) Technology Performance, Design, and Operational Factors (PSTA Study)	• Muck removal and low inflow TP concentrations/loads resulted in annual flow weighted mean discharge of TP $\leq$ 13 ppb for last 14 years • Continue monitoring to evaluate performance
Evaluation of Sampling Methods for Total P (TP) (Sampling Study)	• Time-based auto and grab samples more reliable for low flow gated structures • Autosamplers vulnerable to plant and animal contamination
Evaluation of the Role of Rooted Floating Aquatic Vegetation (rFAV) in STAs (rFAV Study)	• rFAV does not enhance P reduction in outflow region compared to submerged aquatic vegetation

Studies Completed

Study Title	Major Findings
Evaluation of P Sources, Forms, Flux and Transformation Processes in the STAs (P Flux Study)	• P removal is primarily organic in EAV and primarily mineral SAV • P gradients decrease from inflow to outflow • No-flow conditions result in increased water column TP in SAV regions, especially after high load events • Internal loading affects STA performance
STA Water and P Budget Improvements (Water and P Budget Study)	• Improved Period of Record flow data at all structures of STA-2 Flow-ways 1, 2, 3 and STA-3/4 all flow-ways • Improved accuracy of water budgets (reduced residuals) • Rainfall, ET, change in storage, and seepage are minor contributors • Improved accuracy of TP budgets
Evaluation of Inundation Depth and Duration Threshold for Cattail Sustainability (Cattail Study)	• Water depths > 91 cm for more than 100 days result in observable stress • Test cell treatments • Cattail can adapt to changing water levels > 84 cm in first 8 weeks • Increased leaf elongation • Decline in density of adult and juvenile cattail in first 8 weeks

Ongoing Studies

Study Title	Year Initiated	Expected completion
Use of Soil Amendments and/or Management to Control P Flux (Soil Management Study)	2013	2023
Evaluation of Factors Contributing to the Formation of Floating Tussocks in the STAs (Tussock Study)	2018	2022
Improving Resilience of SAV in the STAs (SAV Resilience Study)	2018	2022
Investigation of the Effects of Abundant Faunal Species on P Cycling in the STAs (Faunal Study)	2018	2022
Periphyton and Phytoplankton P Uptake and Release (Periphyton Study)	2019	2023
L-8 FEB Operational Guidance (L8-FEBOG Study)	2019	2022
Quantifying the Recalcitrance and Lability of P to Optimize P Retention Within STAs (Biomarker Study)	2020	2023
Phosphorus Dynamics in the Everglades Stormwater Treatment Areas (P Dynamics Study)	2020	2023
Data Integration and Analyses (Data Integration Study)	2020	2024

Recent Ongoing Studies

Study Title	Year Initiated	Expected completion
Assess Feasibility and Benefits of Consolidating Accrued Marl in the Submerged Aquatic Vegetation Cells/Flow-ways of the Stormwater Treatment Areas (Marl Study)	2021	2023
Phosphorus Removal Performance of Ecotopes in the STAs (Ecotope Study)	2021	2022
The Effect of Vertical Advective Transport on TP Concentrations in the STAs [Advection]	2021	2023
Sustainable Landscape and Treatment in a Stormwater Treatment Area Study [Landscape]	2022	2023

Soil Management Study

- **Objective**
  - Determine if soil amendment applications and/or soil management techniques can reduce internal P loads
- **Results**
  - Amendment technologies
    - Expensive
    - Effects to downstream Everglades are unknown
    - Amendments no longer part of study
  - Soil inversion (tilling) study (STA-1W Expansion Area 1)
    - Plant surveys
      - SAV in Cell 8 (untilled) > Cell 7 (tilled)
      - *Typha sp*. (cattail) in Cell 7 > Cell 8 Typha
- **Status**
  - Sampling at inflow and outflow structures began in July 2021
  - Sample analysis ongoing, restricted cell operation at startup
  - Additional Plant and internal water quality surveys are planned



Tussock Study

- **Objective**
  - Determine factors that cause the formation of floating cattail (*Typha sp*.) communities and tussocks
- **Results**
  - Predictors of historical tussock formation
    - High-water levels
    - Past land use (agriculture)
    - TP content of soils
  - Unmanned aerial vehicle (UAV) equipped with multispectral scanner used to survey cells and found tussocks not seen in satellite imagery
    - Methodology optimized
- **Status**
  - UAV surveys of all STA Cells completed
    - Data being analyzed
  - Buoyancy model for *Typha* under development



SAV Resilience Study

- **Objective**
  - Investigate the effects of operational and natural environmental conditions affecting SAV health
- **Results**
  - Factors affecting SAV community
    - P loading, soil type, water depth, light, stratification, and herbivory
  - Previously dried soils compared to wet soils
    - Faster germination
    - Growth rates are similar
  - SAV growth reduced in enclosures with fish
  - P load experiments (low P soil)
    - High P load results in high SAV density
  - P load experiments (High P soil)
    - Increase of lowest achievable P concentration
    - Intense stratification (dissolved oxygen reduction)
    - Robust SAV community under all P load conditions
- **Status**
  - P load experiments continue through 2022



Presenter: R. Thomas James

Fauna Study

- **Objective**
  - Quantify abundant fauna and effects on outflow STA cell P-cycling and loading evaluate their effect on P outflow
- **Results**
  - Compared to Everglades
    - Higher density of fish
    - Higher P content
  - Bioturbation can double the TP content in enclosures
  - Excretion by fish can reprocess over 100% of P loading to STAs
- **Status**
  - Fish biomass sampling ongoing
  - Bioturbation experiments completed
    - Analyses is ongoing
  - Excretion rate studies completed
  - Electrofishing calibration study being planned



Periphyton Study

- **Objective**
  - Estimate growth, senescence, P uptake and release rates from periphyton and phytoplankton in downstream STA treatment flow-ways under various flow conditions

- **Results**
  - First Bioavailability study incubations
    - Periphyton community declined when ambient nutrient concentrations (9 – 11 µg/L) were reduced by ~ 50%
    - Slight reduction in surface water P after 3-weeks (1-2 µg/L)

- **Status**
  - Second Bioavailability study incubations complete
    - Sample analyses ongoing
  - Metagenomics study
    - Analyses of samples underway

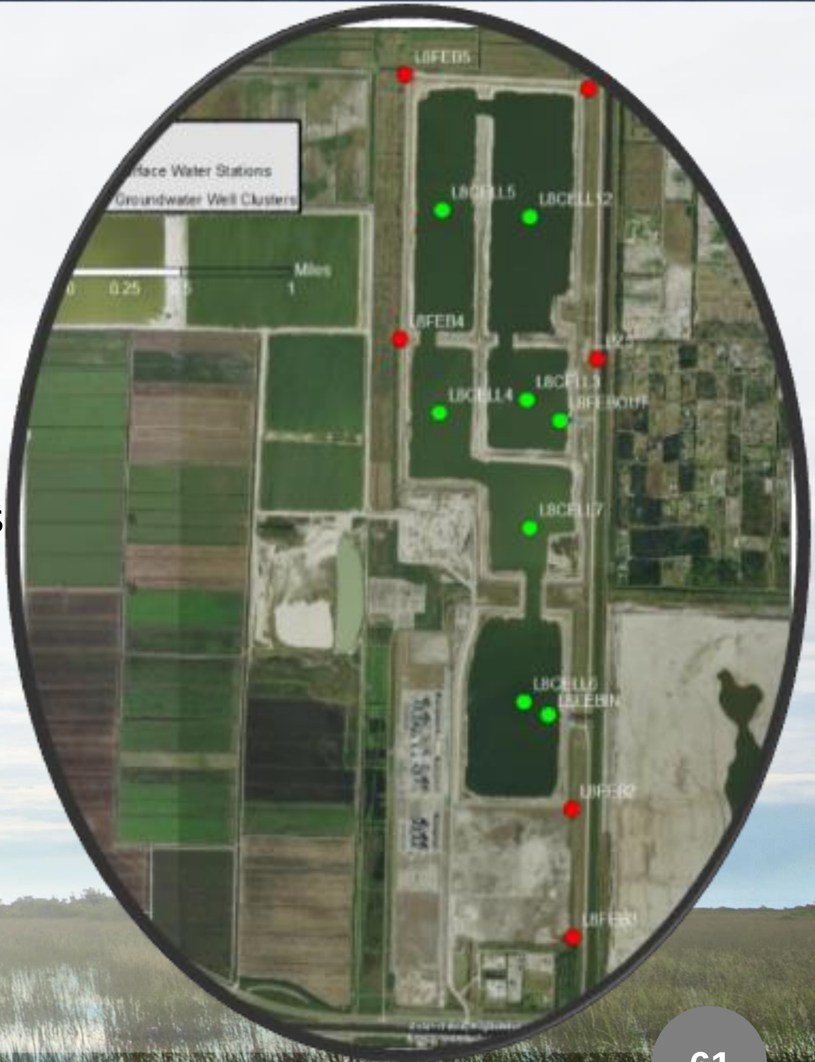


L-8 FEB STUDY

- **Objective**
  - Evaluate relationships among L-8 FEB water quality, stage, flow and groundwater to provide guidance for support of FEB operations to enhance STA performance

- **Results**
  - Potential sources of elevated P in surface water
    - Large inflows
      - Contribute significant loads of nutrients and suspended materials
      - Resuspend TP from benthic sediments
    - Groundwater is not a factor
    - Runoff from embankments is not a factor

- **Status**
  - Monitoring response of L-8 FEB to inflow events
  - Alum injection feasibility study underway



Biomarker Study

- **Objective**
  - Evaluate relationships between organic matter and P; their sources and potential turnover of P within the STAs
- **Results**
  - STA inflow waters and Lake Okeechobee outflow water have varying DOM quality
    - Indicates different sources and turnover
  - Photodegradation in open water and SAV-regions of STAs can affect dissolved organic matter
  - Pilot decomposition and leaching experiment provided valuable information to optimize litter bag experiment
- **Status**
  - A litter and floc decomposition study will be conducted
  - Photochemistry experiments and spectroscopy of STA waters will continue
  - Transect sampling is being planned



Presenter: R. Thomas James

P Dynamics Study

- **Objective**
  - Evaluate mechanisms and factors influencing P reduction in underperforming flow-ways (FW)s
- **Results**
  - One full year of sampling completed
    - STA-2 FWs 3 and FW 4
    - STA-5/6 FW 1
    - STA-3/4 CFW
    - STA-1E EFW and CFW
  - Spatial, flow and seasonal scales
    - Water quality
    - Vegetation
    - Soil
- **Status**
  - Analysis ongoing
  - Sampling ongoing



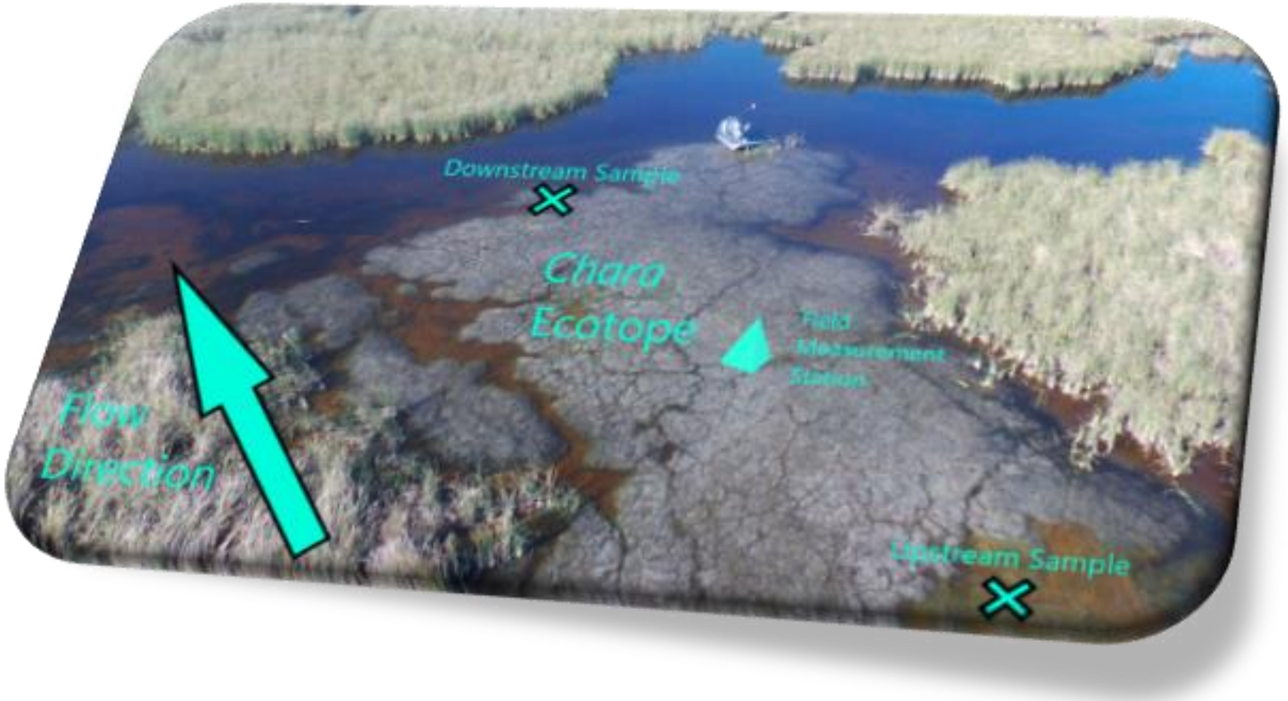
Marl Study

- **Objective**
  - Evaluate drying and/or addition of organic materials to marl soils to improve physical stability, reduce internal P loading and reduce water column P concentrations in the lower reaches of the STAs
- **Results**
  - Marl soils from multiple SAV-dominated sites compared based on physical stability and aggregation
  - Soils from one site selected for an organic amendment study
    - Selection based on high water column turbidity and TP concentrations
- **Status**
  - Experiment to compare stability of organically amended and unamended dried marl soils is underway
  - Three organic amendments being evaluated
    - Dead cattail leaves
    - Sugarcane bagasse
    - Humic soil



Ecotope Study

- **Objective**
  - Estimate P removal by ecotopes commonly found in the STAs
- **Results**
  - Five unique ecotopes selected for study; *Chara, Typha, Najas guadalupensis, Chara/Najas* mix, and bare soil
  - Six months of sampling of ecotope water quality suggests small differences in P treatment performance
  - Additional samples are required to determine if these differences between are statistically significant and meaningful
- **Status**
  - On- going
  - Stop/go meeting scheduled for June

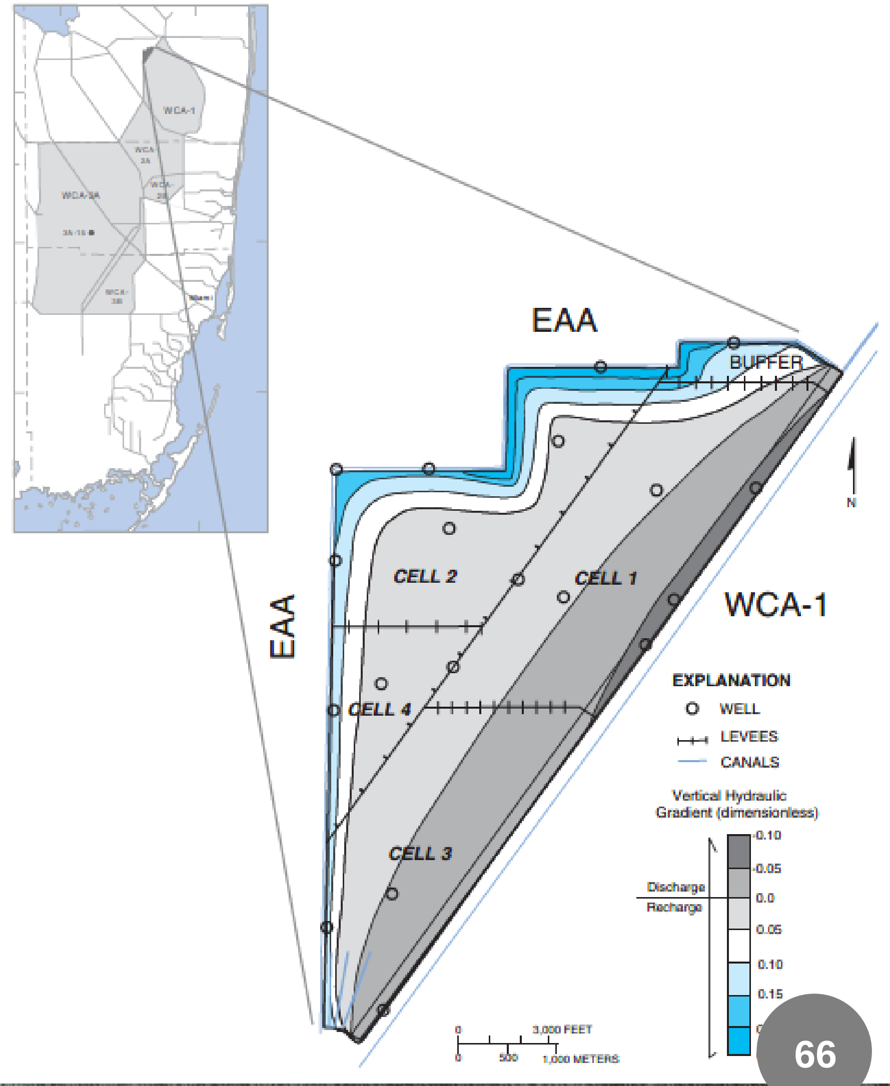


Advection Study

- **Objective**
  - Quantify the relative magnitude/importance of P loading from positive seepage across the soil/water interface

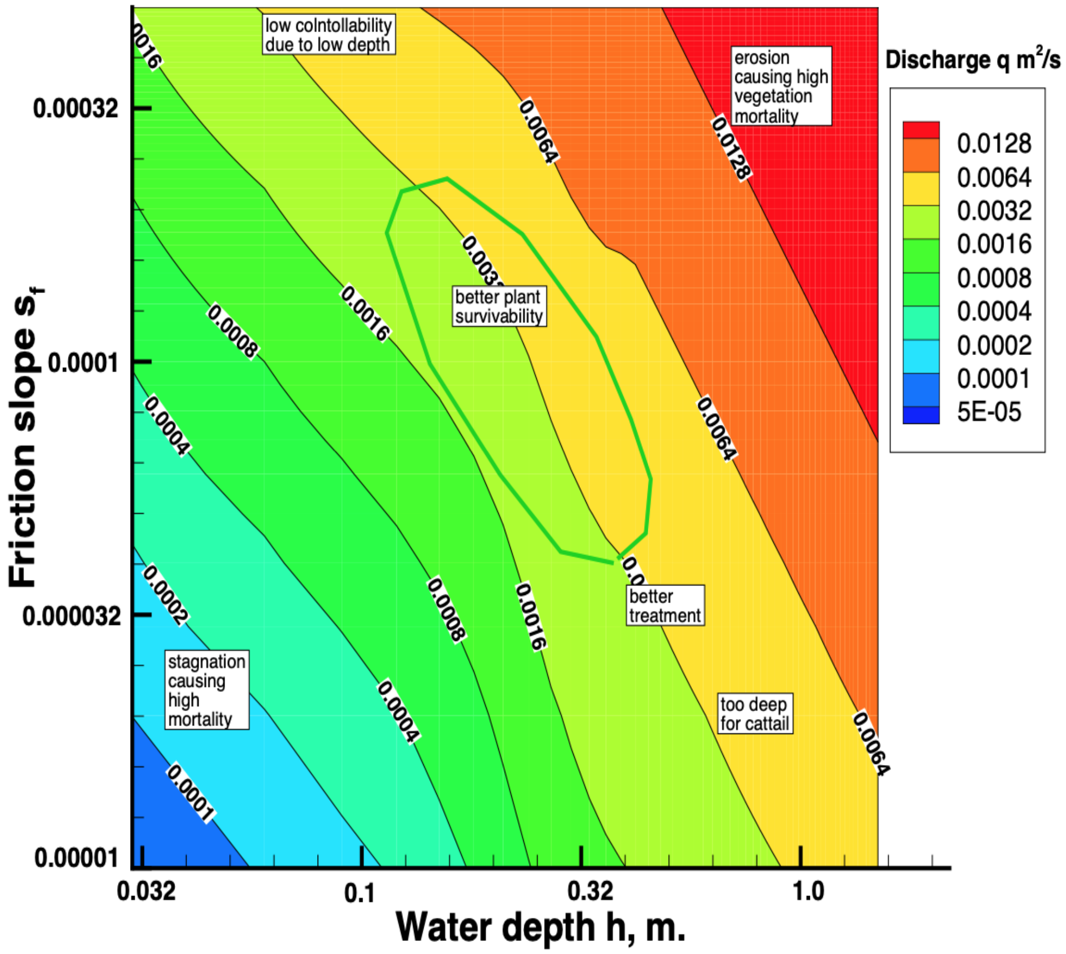
- **Results**
  - Project Documentation Report Completed
  - Detailed Study Plan Approved

- **Status**
  - Work Order Initiated for Phase I
    - Literature review
    - Historical data analyses and budgets
    - Simple P model including seepage



Landscape Study

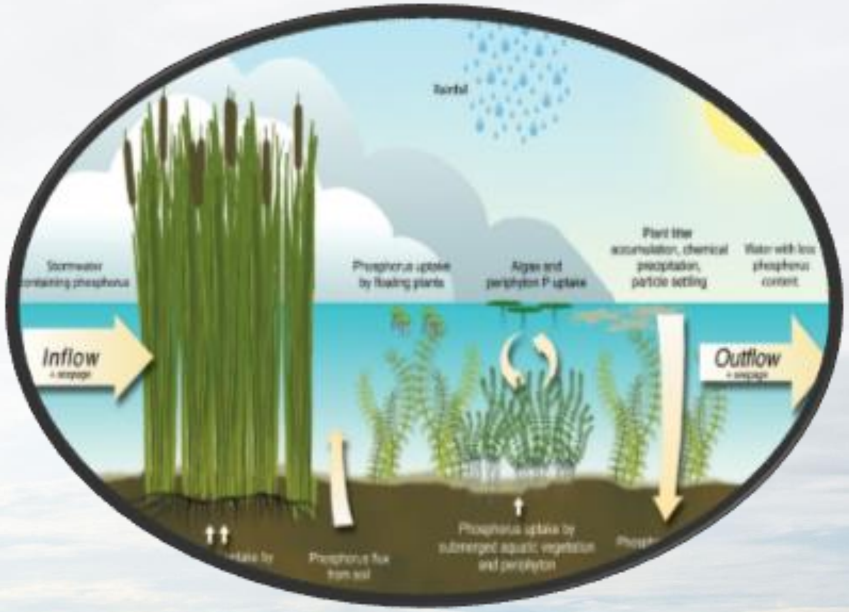
- **Objective**
  - Quantify flow effects on hydraulic mixing
- **Results**
  - Ongoing
- **Status**
  - Detailed Study Plan developed
  - Work Order under negotiation
  - Project Documentation Report complete



Data Integration Study

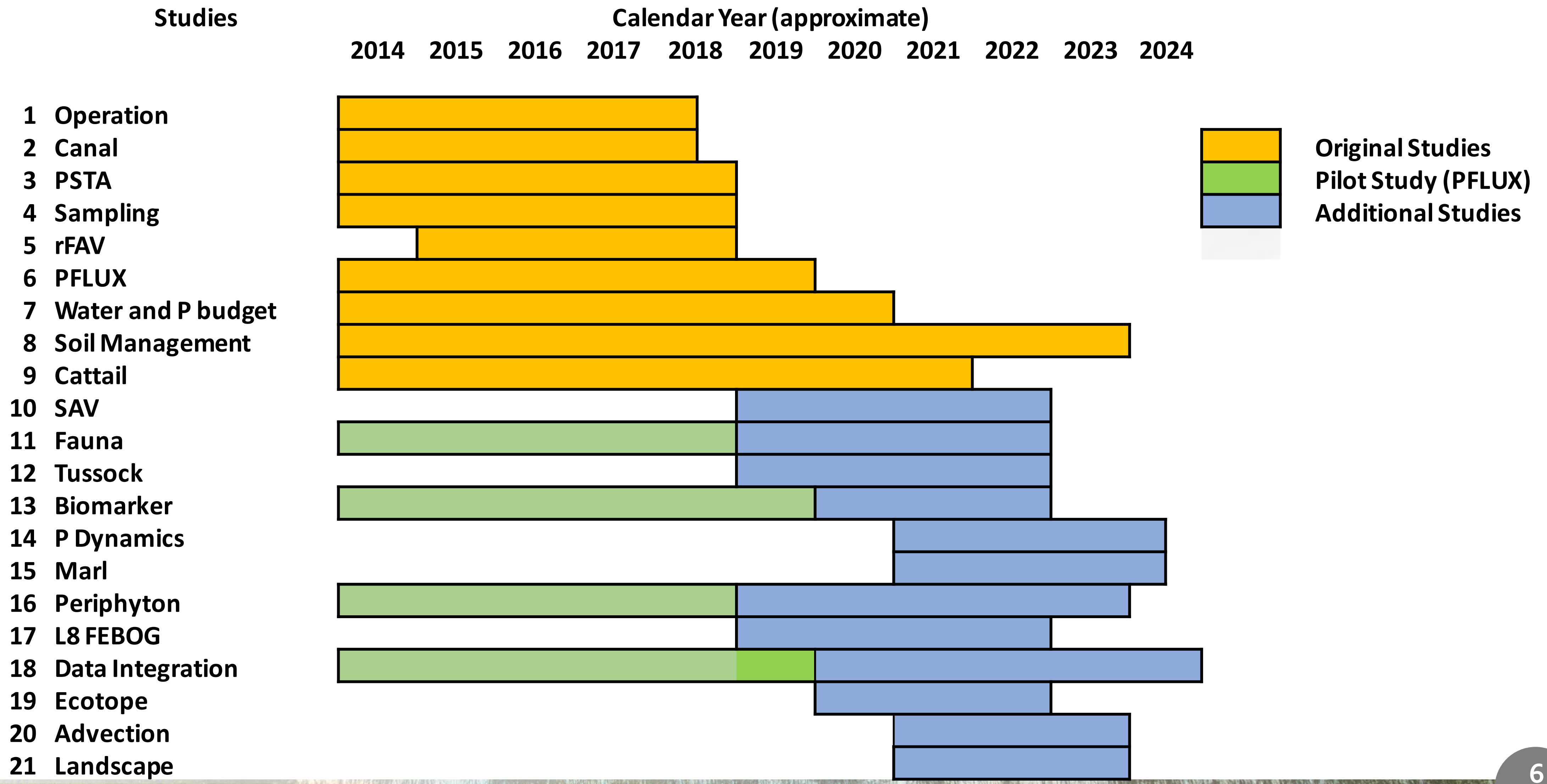
- **Objective**
  - Develop a comprehensive description of P dynamics and factors affecting Everglades STA performance through document review, data review and analyses, and modeling

- **Results**
  - Microbial literature review
    - Reduced mineralization in soils and enhanced enzyme activity in water column promote lower TP outflow concentrations
  - Analyses of outflow soil, water, plants
    - Dense SAV results in low TP outflow (typically not below 13 ppb)
    - Soil management to reduce internal P load can result in lower TP outflow
  - Period of Record monthly water quality data set for all STAs compiled
    - Analyzed using Structural Equation Models
      - Limited consistency among STAs
      - Lower inflow TP results in lower outflow TP concentrations
  - Biogeochemical EAV model of STA-2 FW1 has been developed and calibration is ongoing



- **Status**
  - Biogeochemical model development continues
  - Food web model being developed

Science Plan Study Timelines



Contact and More Information

Tom James

tjames@sfwmd.gov

https://apps.sfwmd.gov/sfwmd/SFER/2021_sfer_final/v1/chapters/v1_ch5c.pdf

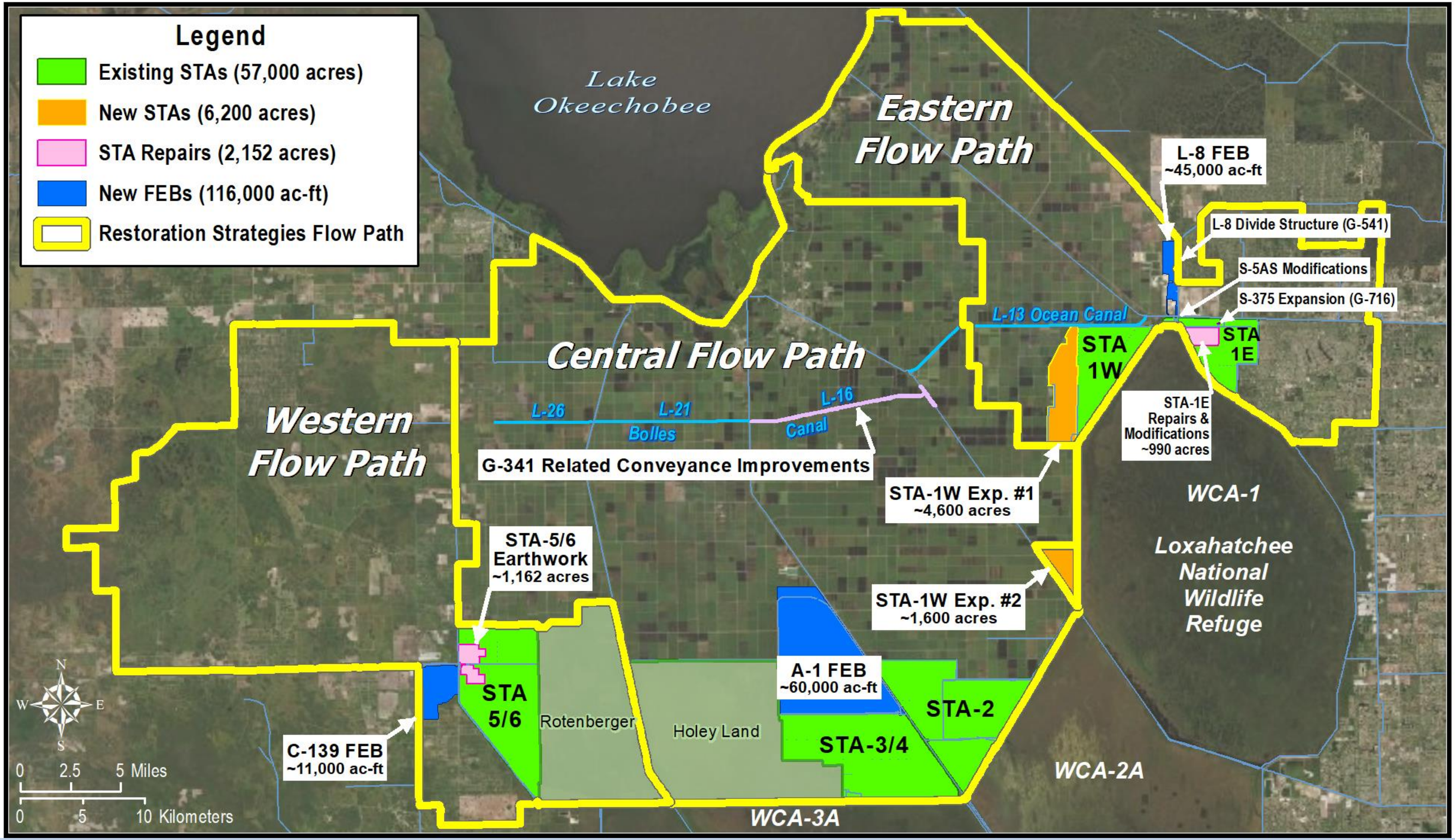
https://www.sfwmd.gov/our-work/restoration-strategies/science-plan

Restoration Strategies:
Engineering & Construction Update

Lucine Dadrian, P.E.
Project Management Section Administrator
Engineering and Construction

sfwmd.gov

19th Annual Public Meeting on the Long-Term Plan for Achieving Water Quality Goals for the Everglades Protection Areas Tributary Basins
February 28, 2022



Presenter: Lucine Dadrian

Restoration Strategies Project Status

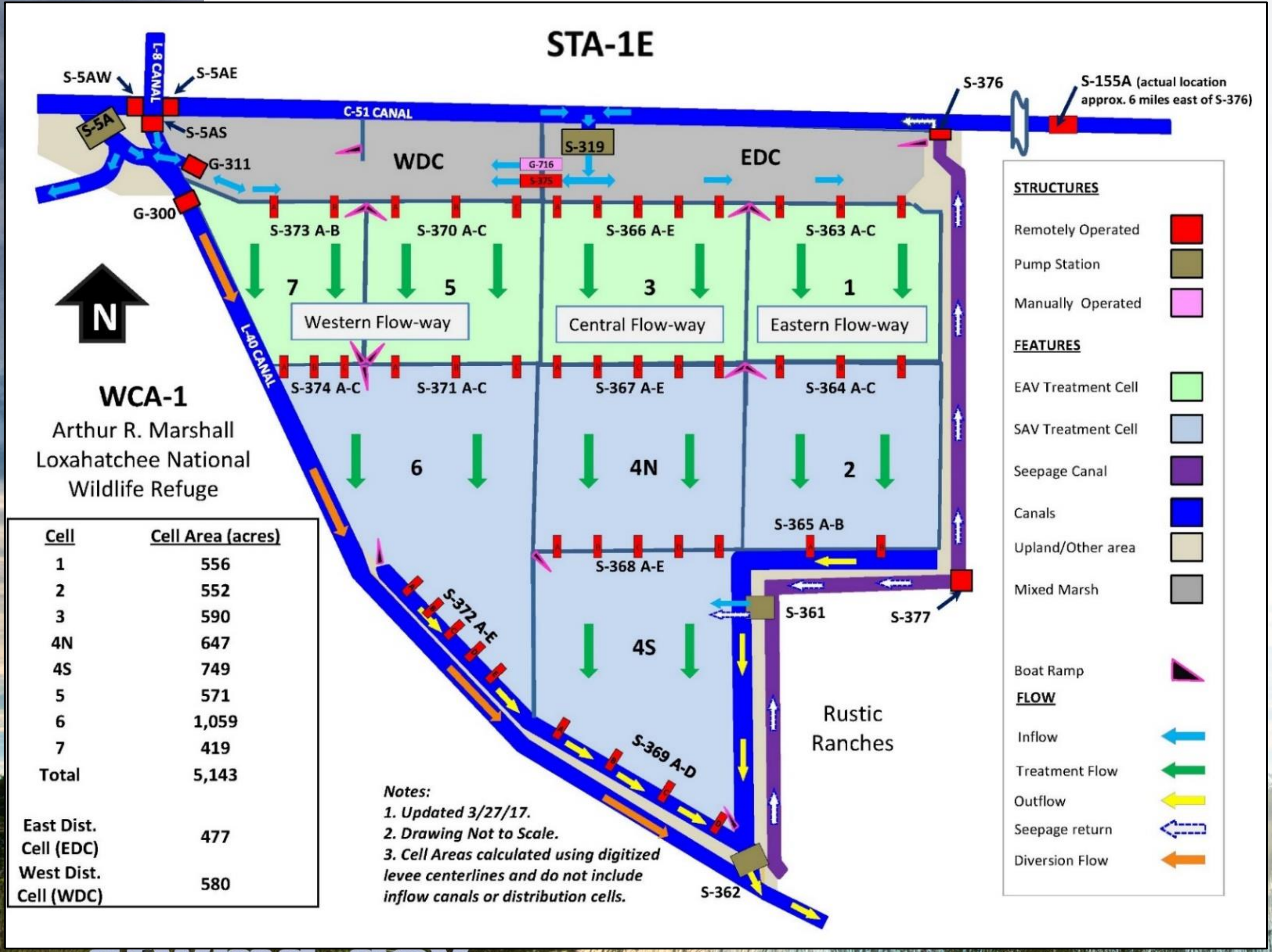
Completed Construction:

- STA2 Expansion Compartment B
- STA 5/6 Expansion Compartment C
- S-5AS Modifications
- L-8 FEB *Multi-Use Operation*
- A-1 FEB
- L-8 Divide Structure (G-541)
- S-375 Expansion (G-716)
- STA 5/6 Earthwork *Optimization*
- STA-1W Expansion #1
- G-341 Segments 1 – 4

Ongoing:

- STA-1E Repair *Construction*
- STA-1W Expansion #2 *Construction*
- G-341 Conveyance Seg 5 *Out for bids*
- C-139 FEB *Construction*

STA-1E Repairs & Modifications Project



Cell	Cell Area (acres)
1	556
2	552
3	590
4N	647
4S	749
5	571
6	1,059
7	419
Total	5,143
East Dist. Cell (EDC)	477
West Dist. Cell (WDC)	580

- Raise and regrade ~990 acres in Cells 5 and 7 to achieve sustainable Emergent Aquatic Vegetation
- USACE Designed and Constructed STA-1E
  - Adjacent to northeast side of WCA-1 (Loxahatchee National Wildlife Refuge)
  - Flood control by stormwater retention
  - Stormwater treatment
  - Re-establish WCA-1 hydro-periods
- Transferred to SFWMD in October 2005
  - Cells 5 & 7 experienced performance issues related to excessive water depths
  - Complete regrading of Cells 5 & 7 by December 31, 2022 per Consent Order

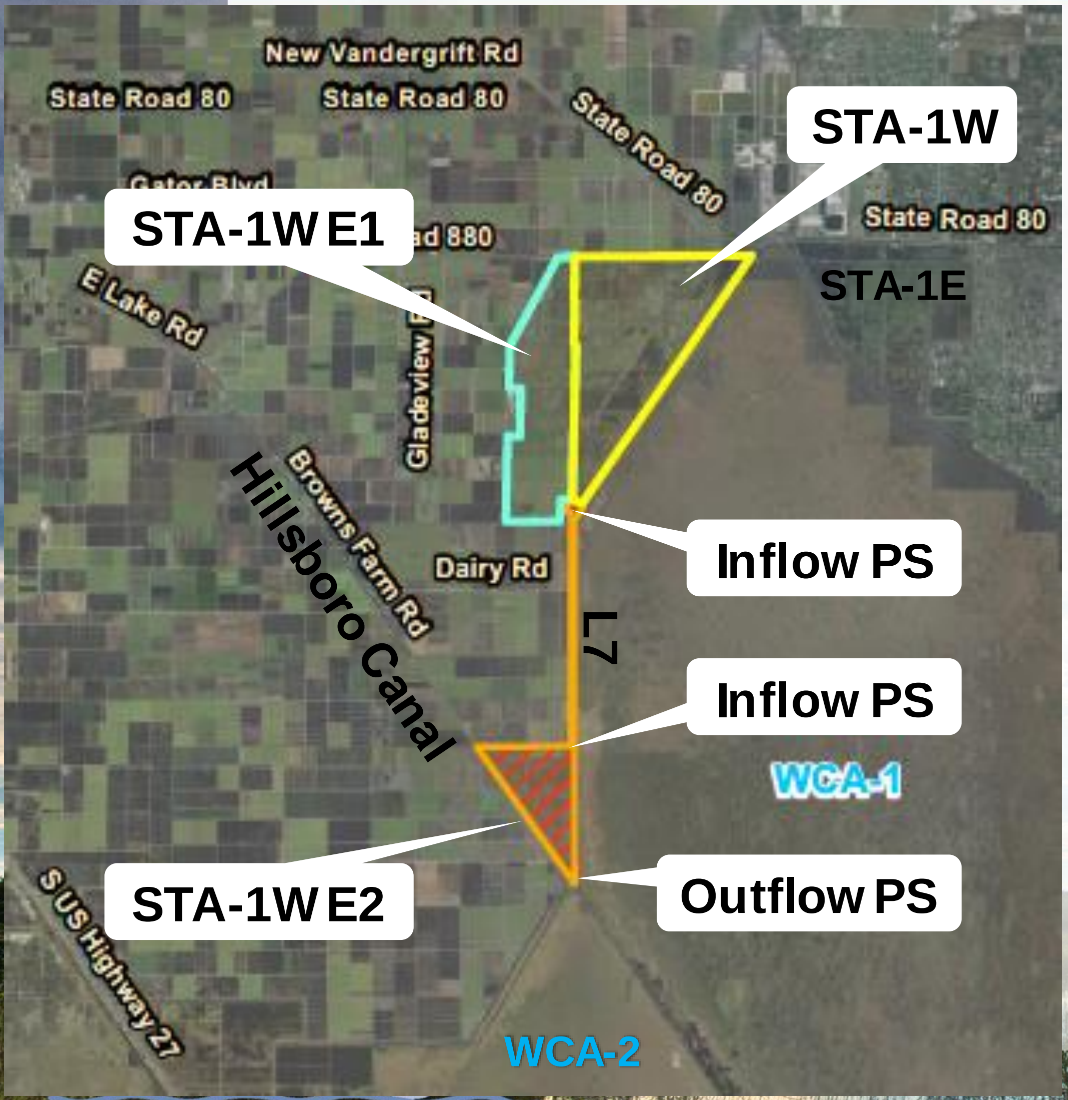
STA-1E Repairs & Modifications Project

- December 2021 Aerial Survey
- Cell 5
  - Regrading complete
  - Replanting complete
- Cell 7
  - Regrading complete
  - Replanting has begun
- Substantial Completion January 2022



Presenter: Lucine Dadrian

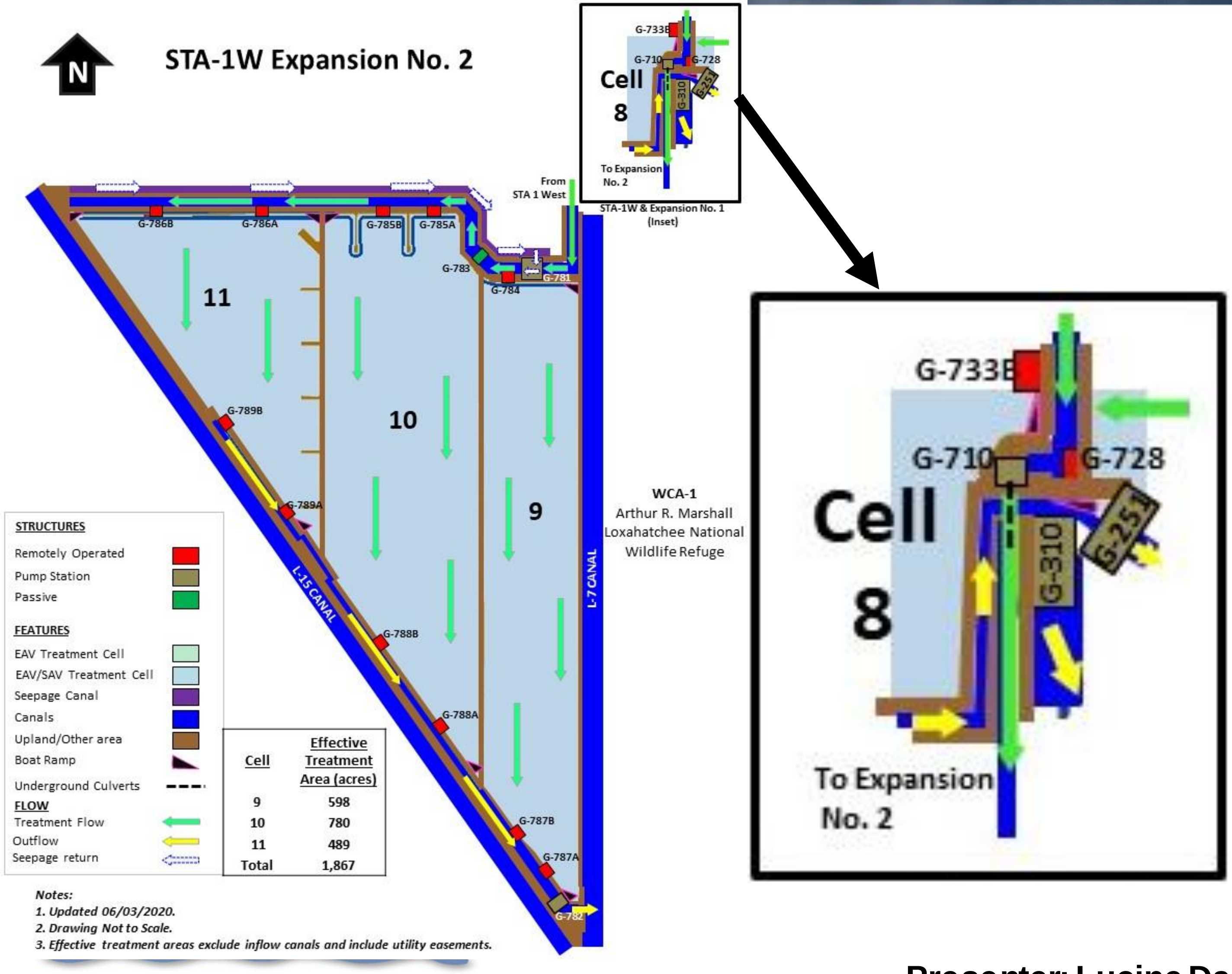
STA-1W Expansion No. 2



- Purpose is to extend treatment flow-ways for STA-1W
- Overall Construction Cost $214M
- Features 1,600 acres of additional treatment area
- Inflows from S-5A and C-51 West Basins via STA-1W
- Outflow to Water Conservation Area 1

STA-1W Expansion No. 2

Schedule of Construction



- ➢ Underground Piping Complete
  - ▪ Construction Complete - December 2020
- ➢ STA and Connector Canal
  - ▪ Start Construction - September 2020
  - ▪ 55% Complete
- ➢ Inflow Pump Stations (G780 & G781)
  - ▪ Start Construction – November 2020
  - ▪ 30% Complete
- ➢ Outflow Pump Station (G782)
  - ▪ Start Construction – November 2020
  - ▪ 20% Complete
- ➢ Complete Construction / Consent Order Milestone – December 2022

Presenter: Lucine Dadrian

STA-1W Expansion No. 2

STA Civil Works



North Inflow Canal and Levee

Northern Section of
Concrete Conveyance Canal



STA-1W Expansion No. 2

Inflow Pump Stations



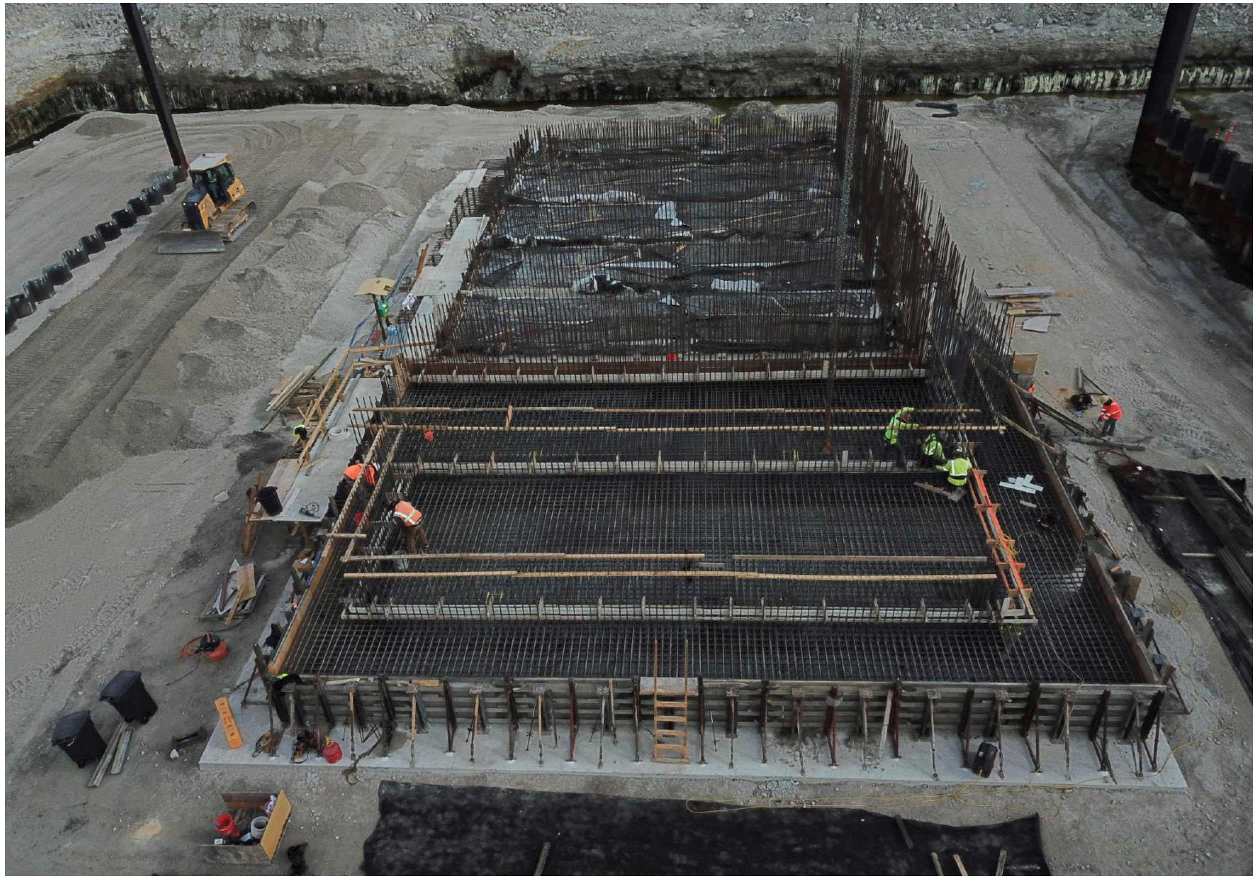
G-780 Building Pier Walls for Intake Bays



G-781 Building Pier Walls for Intake Bays

STA-1W Expansion No. 2

Outflow Pump Station



G-782 Base Slab Rebar Placement

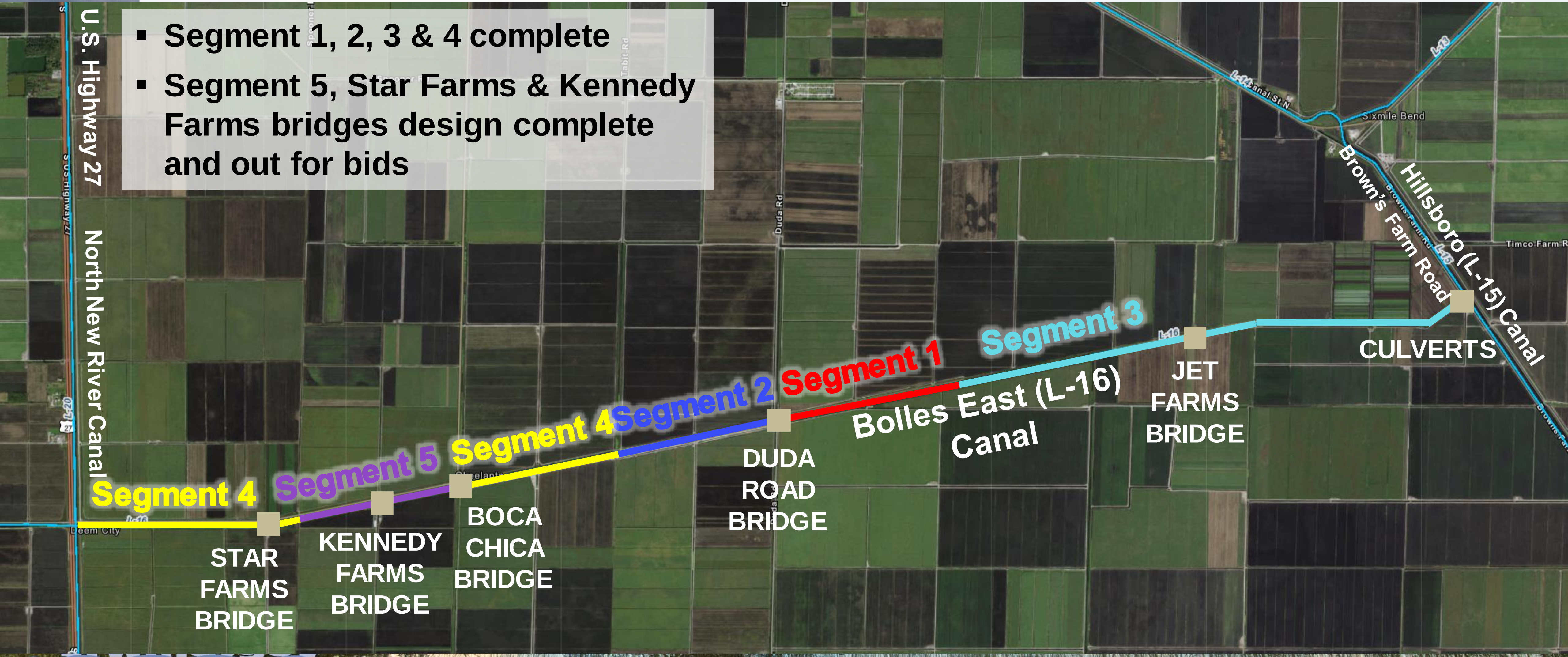


G-782 Base Slab Concrete Placement

G-341 Related Conveyance Improvements

Bolles East Canal

- Segment 1, 2, 3 & 4 complete
- Segment 5, Star Farms & Kennedy Farms bridges design complete and out for bids



G-341 Related Conveyance Improvements

Bolles East Canal – Segment 4



Slab Beam Installation



Completed Boca Chica Bridge

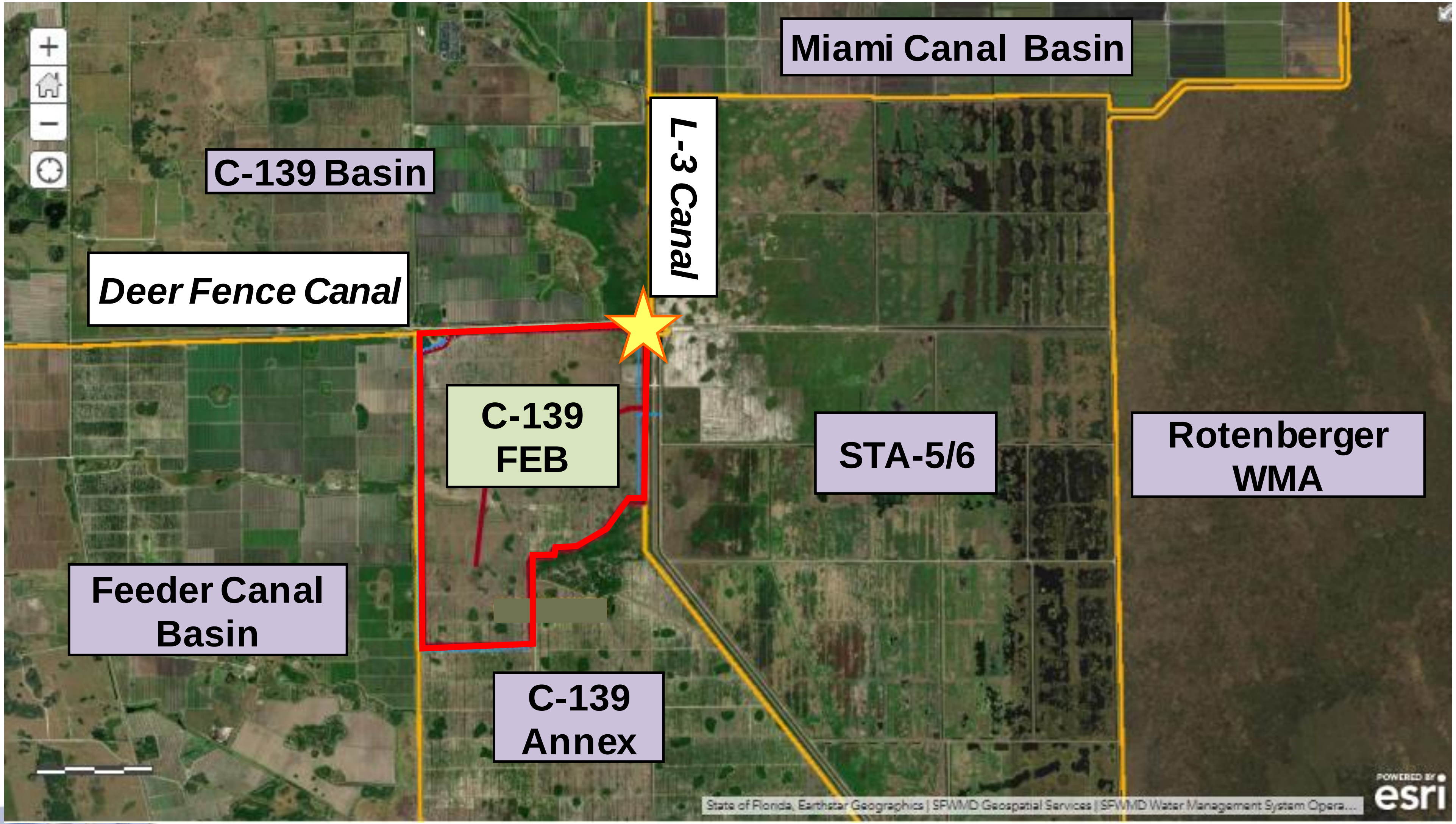
G-341 Related Conveyance Improvements

Bolles East Canal – Segment 4



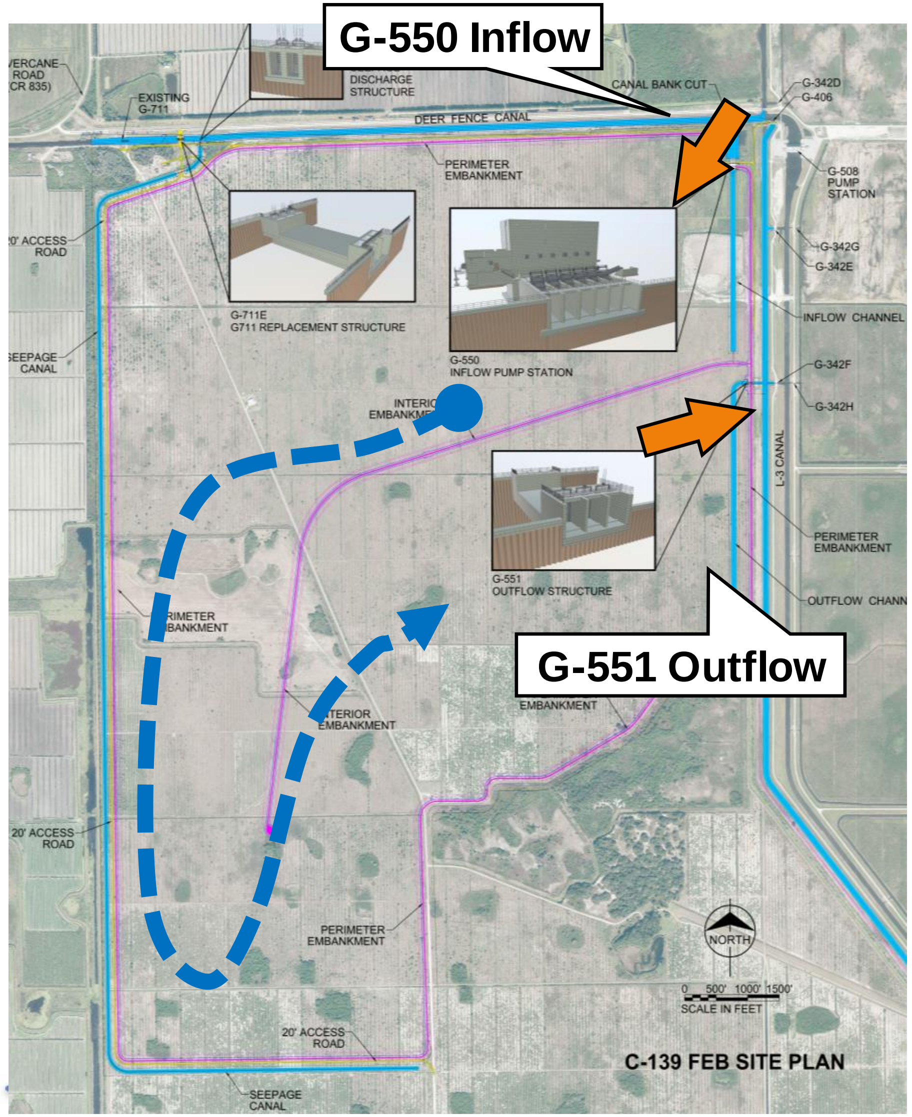
Presenter: Lucine Dadrian

C-139 Flow Equalization Basin



Presenter: Lucine Dadrian

C-139 Flow Equalization Basin



- Overall Project - 28% Complete
- G550 PS - Excavation 75% Complete
- G551 - Concrete 45% Complete
- Flow Equalization Basin
  - Land Levelling 25% Complete
  - Levee 18% Complete
  - Canal 25% Complete

Presenter: Lucine Dadrian

C-139 Flow Equalization Basin



Western Perimeter Levee & Seepage Canal



G-551 Bay Structure Reinforcement

Presenter: Lucine Dadrian

C-139 Flow Equalization Basin



G-550 Pump Station Foundation Excavation

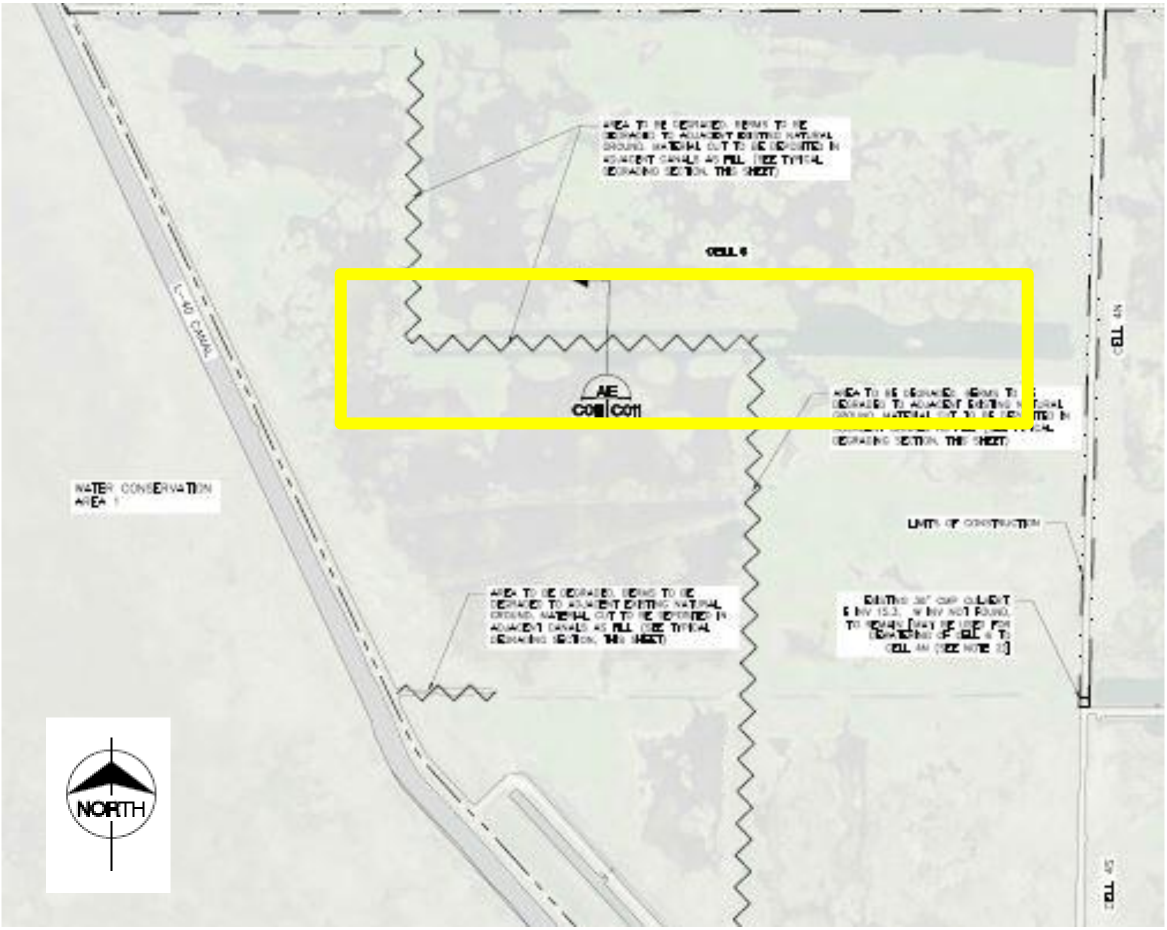


Western Seepage Canal Excavation

STA Refurbishments – STA-1E

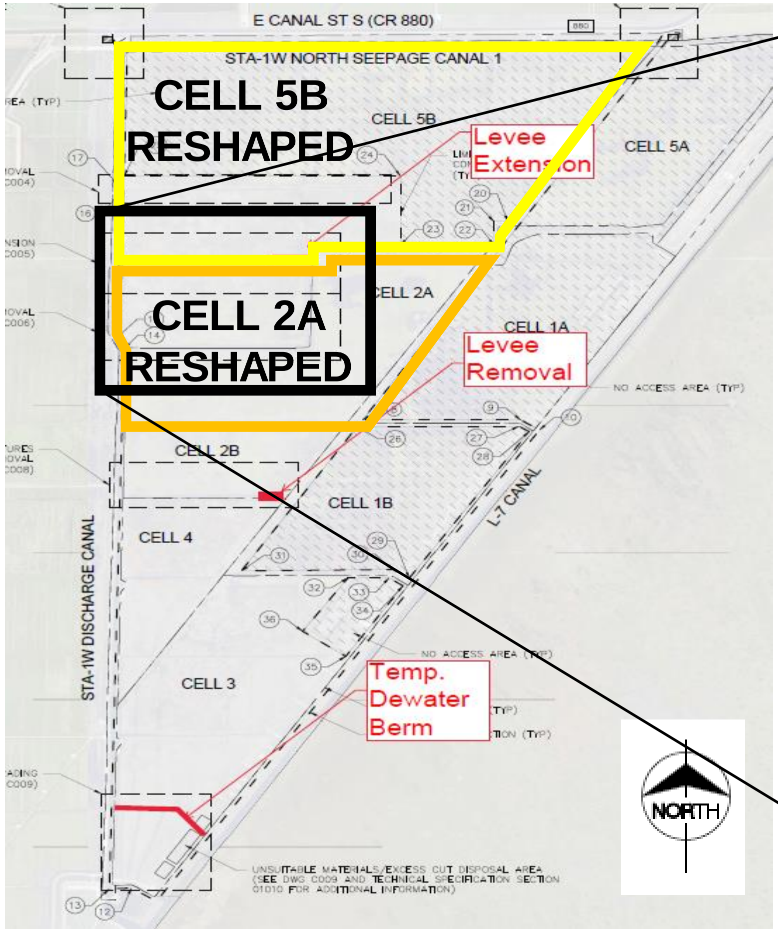


STA-1E Cell 6 – Berm Degrade Facing East

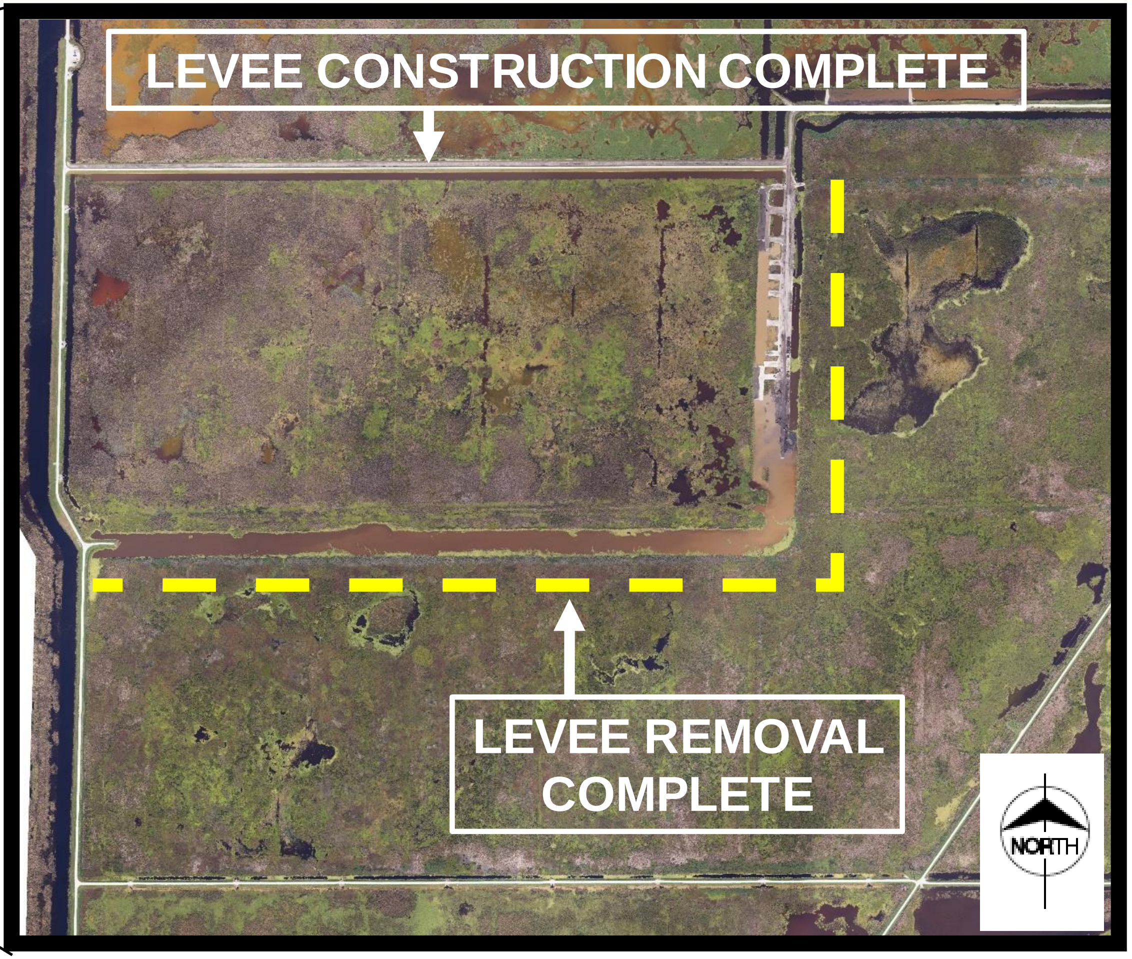


STA-1E Cell 6 – Berm Degrade Plan

STA Refurbishments – STA-1W

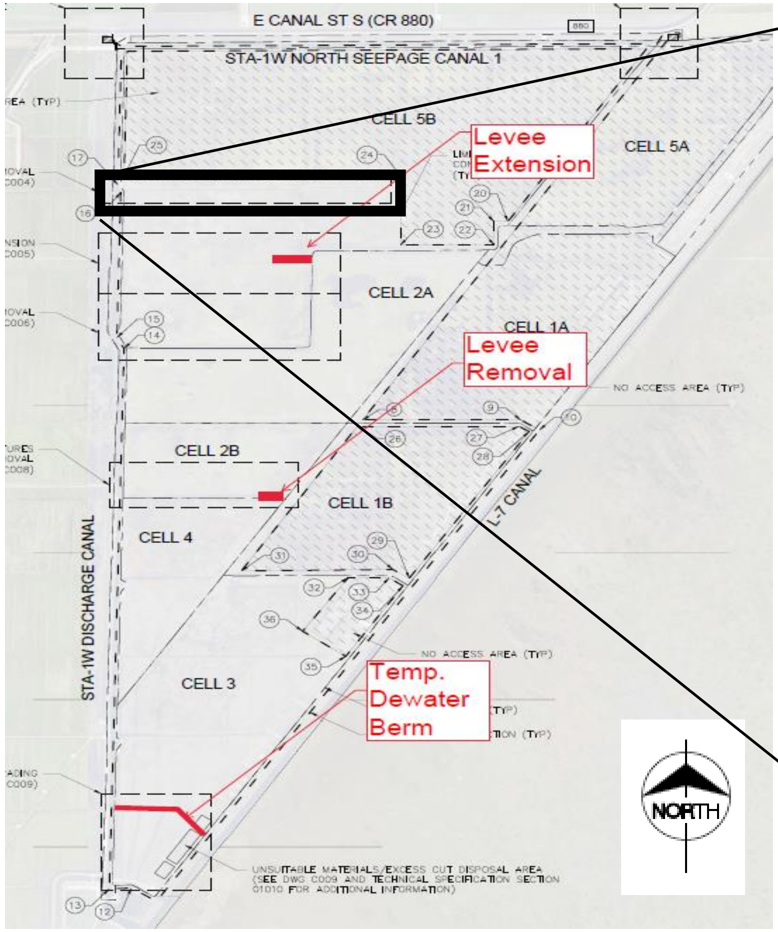


STA-1W Schematic

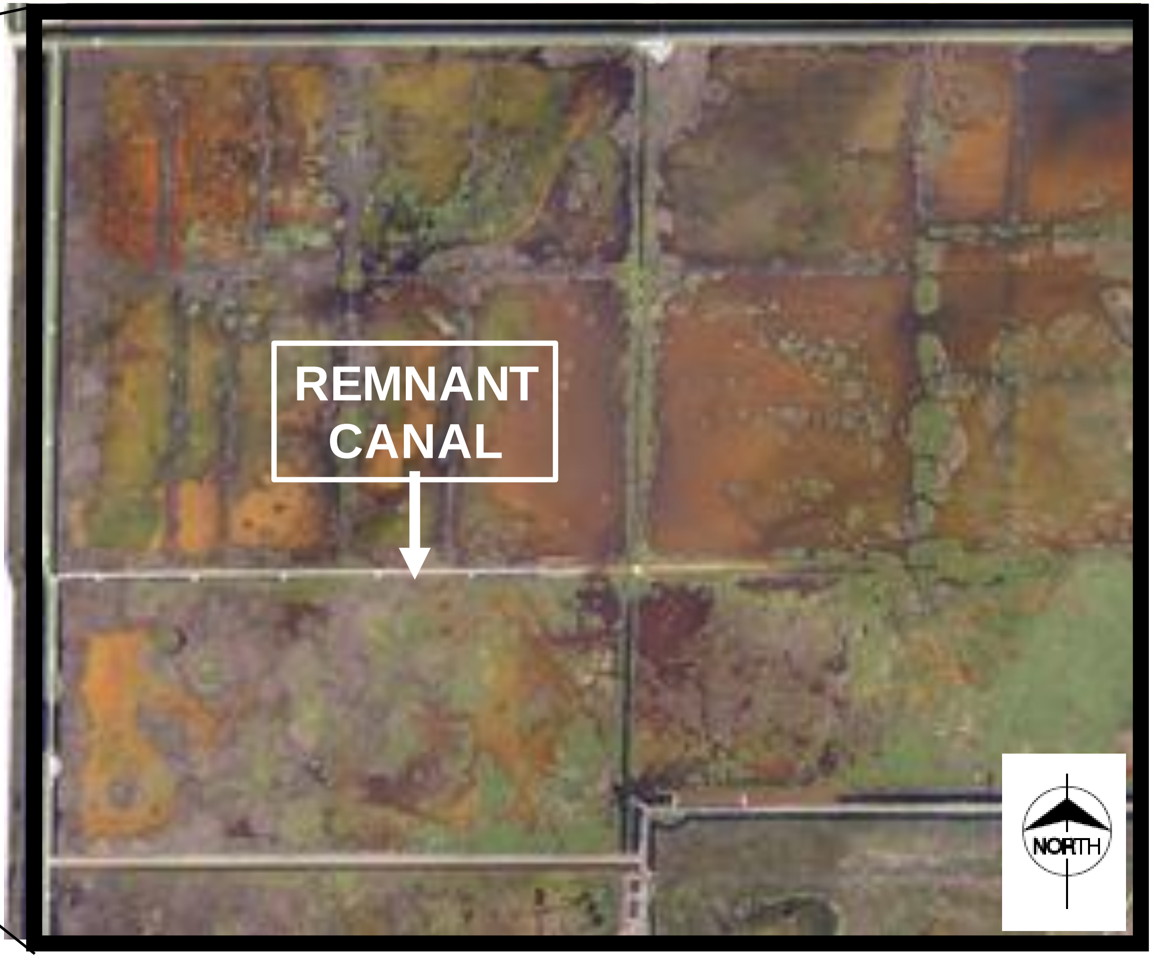


STA-1W Cell 5B/2A Levee Relocation to create 2 rectangular cells

STA Refurbishments – STA-1W

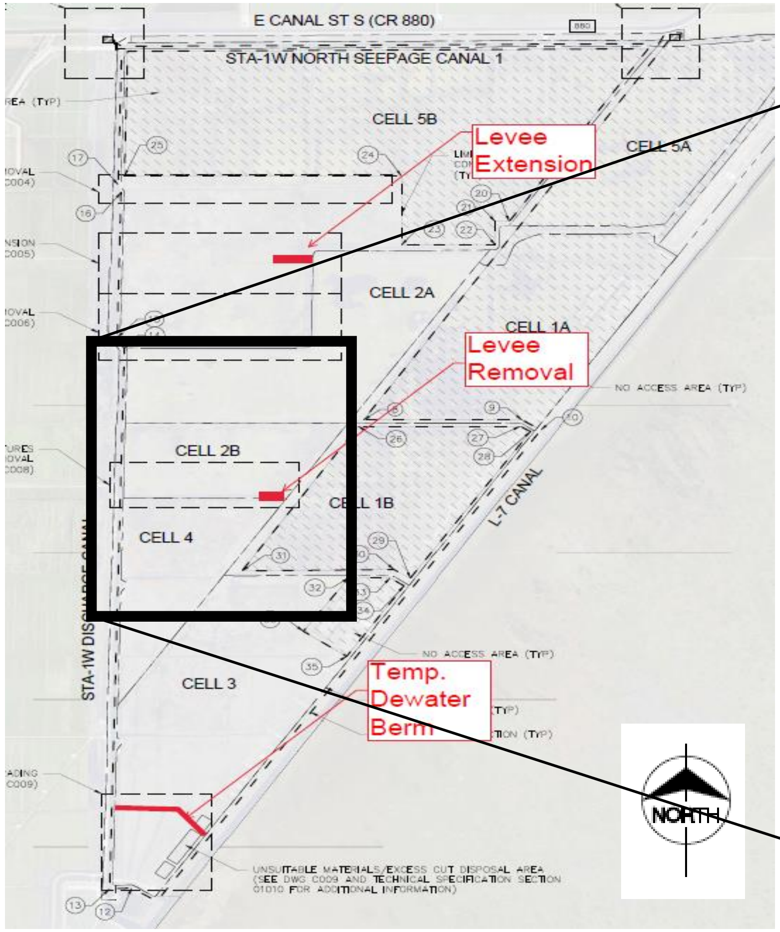


STA-1W Schematic



STA-1W Cell 5B Remnant Canal Fill
50% Complete

STA Refurbishments – STA-1W

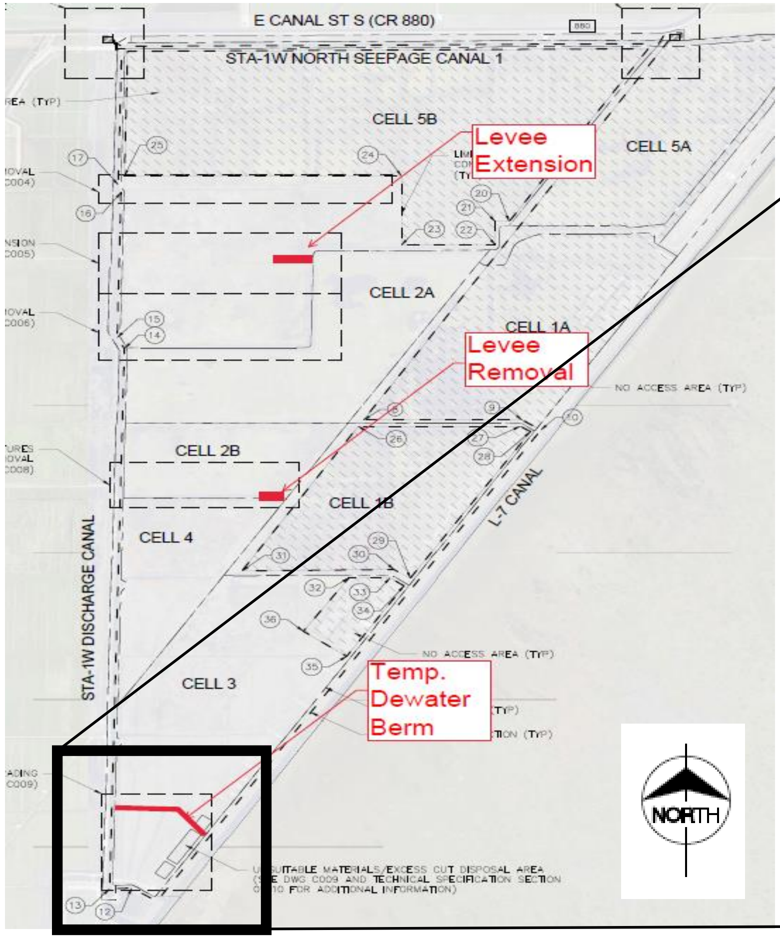


STA-1W Schematic

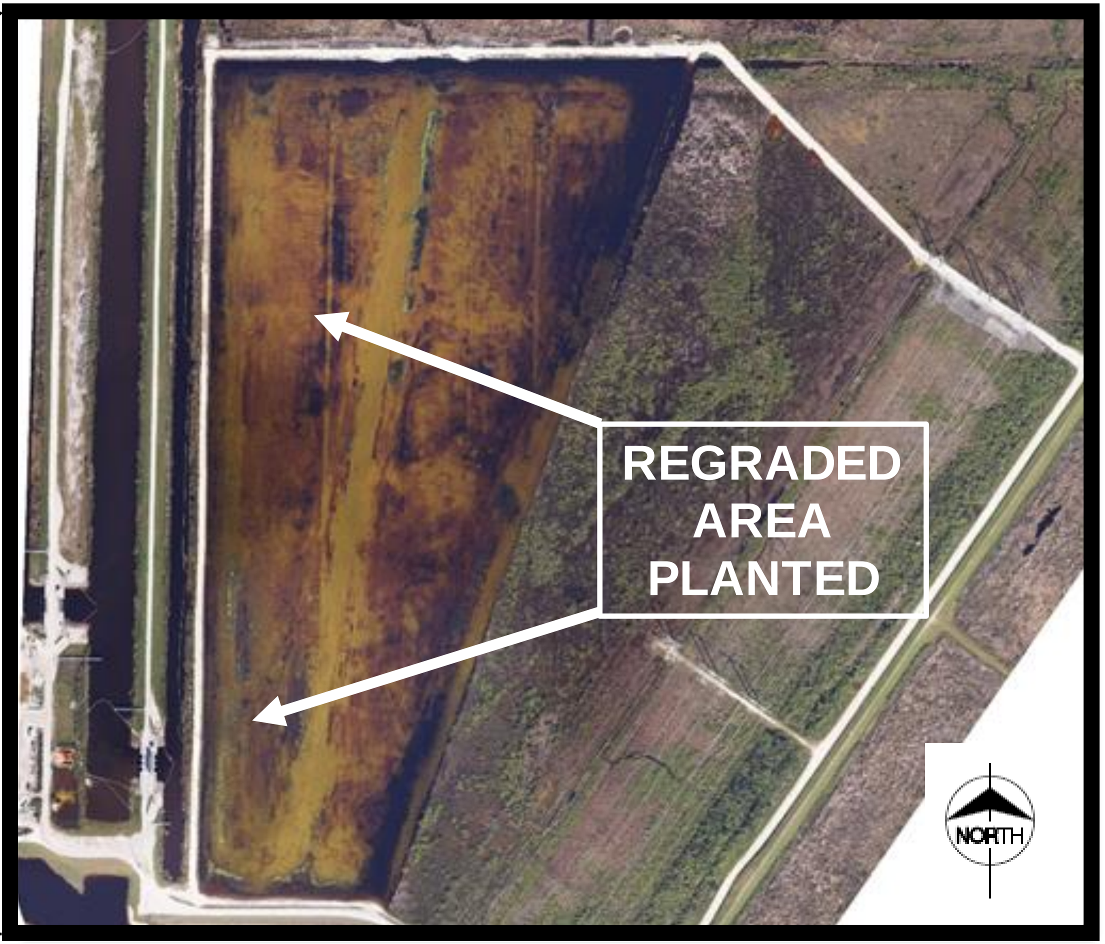


STA-1W Cell 2B/4 Levee Removal to create a single, larger cell

STA Refurbishments – STA-1W

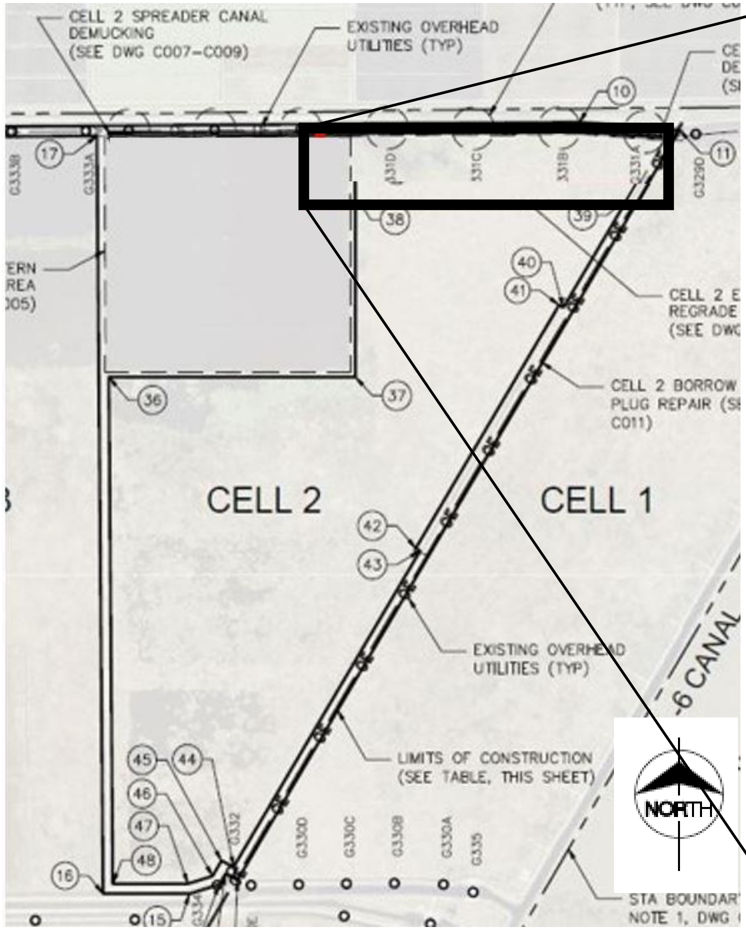


STA-1W Schematic



STA-1W Cell 3 – Grading & Planting Complete to remove finger canals and lower grade

STA Refurbishments – STA-2 Cell 2

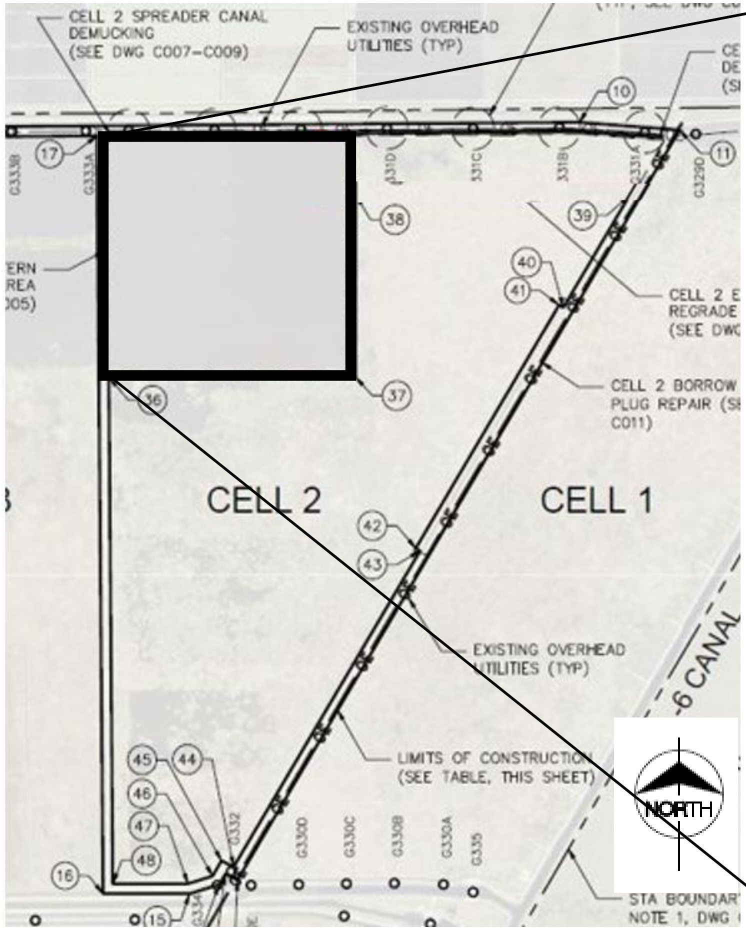


STA-2 Schematic



STA-2 Cell 2 Eastern Regrade Area
regrading 90% complete

STA Refurbishments – STA-2 Cell 2



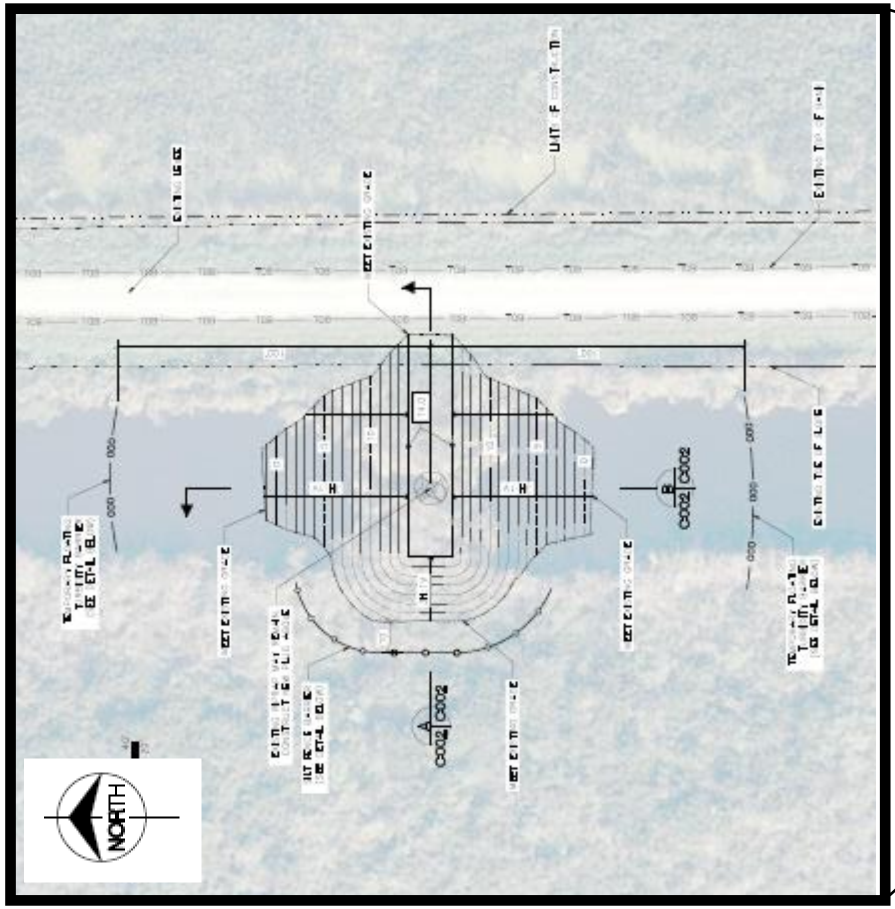
STA-2 Schematic



STA-2 Cell 2 Western Regrade Area
dewatering berms built, regrading 15% complete

Presenter: Lucine Dadrian

STA Refurbishments – STA-2 Cell 3



Typical Canal Plug Plan View



STA-2 Cell 3 East Borrow Canal
Restoration 49 of Canal Plugs – Jan 2023

Presenter: Lucine Dadrian

EASTERN FLOW PATH

STA-1W Expansion #2 (100864)

Activity	Deadline	
Complete land acquisition	3/31/2018	✓
Initiate design	10/1/2018	✓
Submit state and federal permit applications	8/1/2019	✓
Complete design	7/31/2020	✓
Initiate construction	11/30/2020	✓
Construction status report	3/1/2021	✓
Construction status report	**3/1/2022**	
Complete construction	**12/31/2022**	
Initial flooding and optimization period complete	12/31/2024	

STA-1W Expansion #1 (100818)

COMPLETE

Activity	Deadline	
Complete land acquisition	9/30/2013	✓
Initiate design	9/30/2013	✓
Submit state and federal permit applications	7/30/2014	✓
Complete design	7/30/2015	✓
Initiate construction	1/31/2016	✓
Construction status report	3/1/2017	✓
Construction status report	3/1/2018	✓
Complete construction	12/31/2018	✓
Initial flooding and optimization period complete	12/31/2020	✓

STA-1E Repairs and Modifications

Activity	Deadline	
PSTA Decommissioning complete	12/31/2022	✓
Culvert repairs complete	12/31/2022	✓
Cell 5 and 7 improvements complete	**12/31/2022**	

L-8 FEB (100813)

Activity	Deadline	
Submit state and federal permit applications	1/31/2014	✓
Construction status report	3/1/2014	✓
Construction status report	3/1/2015	✓
Complete construction (begin multi-purpose ops)	12/31/2016	✓
Long term operations commence	**12/31/2022**	

G-341 Related Conveyance Improvements (100802)

Activity	Deadline	
Initiate design	10/1/2020	✓
Submit state and federal permit applications	8/1/2021	✓
Complete land acquisition (if required)	9/30/2021	✓
Complete design	**7/31/2022**	
Initiate construction	11/30/2022	✓
Construction status report	3/1/2023	✓
Construction status report	3/1/2024	
Complete construction	12/31/2024	

L-8 Divide Structure (100817)

COMPLETE

Activity	Deadline	
Initiate design	10/1/2012	✓
Complete design	9/30/2014	✓
Initiate construction	10/1/2016	✓
Complete construction	9/30/2018	✓

S-5AS Modifications (100822)

COMPLETE

Activity	Deadline	
Initiate design	10/1/2012	✓
Complete design	9/30/2014	✓
Initiate construction	10/1/2014	✓
Complete construction	9/30/2016	✓

S-375 Expansion (100819)

COMPLETE

Activity	Deadline	
Initiate design	9/30/2013	✓
Complete design	7/30/2015	✓
Initiate construction	1/31/2016	✓
Complete construction	12/31/2018	✓

LEGEND
- Flow Equalization Basin
- Stormwater Treatment Area
- Conveyance Improvement
- ✓ Complete

Projects Complete = 7 of 13
Activities Complete = 61 of 74
% Activities Complete = 82%
% Time Complete = 70%

CENTRAL FLOW PATH

STA-2 Expansion: Compartment B

COMPLETE

Activity	Deadline	
Initial flooding and optimization period complete	5/31/2014	✓

A-1 FEB (100706)

COMPLETE

Activity	Deadline	
Initiate design	4/1/2012	✓
Submit state and federal permit applications	12/1/2012	✓
Design status report	3/1/2013	✓
Complete design	8/1/2013	✓
Initiate construction	6/30/2014	✓
Construction status report	3/1/2015	✓
Construction status report	3/1/2016	✓
Complete construction	7/30/2016	✓
Operational monitoring and testing period complete	7/29/2018	✓

WESTERN FLOW PATH

STA-5/6 Internal Improvements (100868)

Activity	Deadline	
Initiate design	10/31/2019	✓
Submit state and federal permit applications	8/30/2020	✓
Complete design	10/31/2021	✓
Initiate construction	1/31/2022	✓
Construction status report	3/1/2023	✓
Construction status report	3/1/2024	✓
Complete construction	12/31/2024	✓
Initial flooding and optimization period complete	12/31/2025	

STA-5/6 Expansion: Compartment C

COMPLETE

Activity	Deadline	
Initial flooding and optimization period complete	5/31/2014	✓

C-139 FEB (100867)

Activity	Deadline	
Initiate design	10/31/2018	✓
Submit state and federal permit applications	8/30/2019	✓
Complete design	10/31/2020	✓
Initiate construction	1/31/2021	✓
Construction status report	3/1/2021	✓
Construction status report	**3/1/2022**	
Construction status report	3/1/2023	
Complete construction	12/31/2023	
Operational monitoring and testing period complete	12/31/2024	

Presenter: Lucine Dadrian

Contact Information

Lucine Dadrian
ldadrian@sfwmd.gov

SFWMD Southern Everglades Nutrient Source Control Program Update

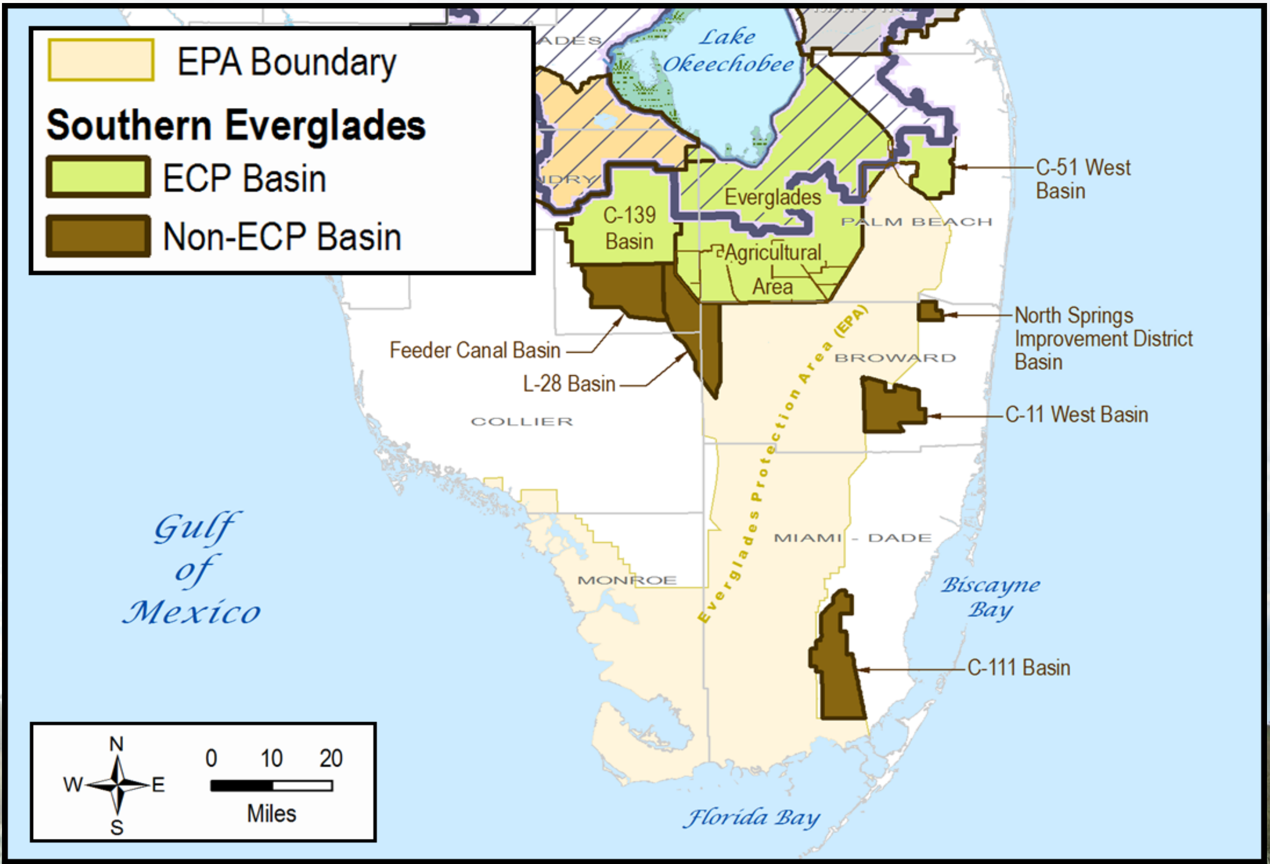
Everglades National Park

Youchao Wang, P.E.
Steve Sarley, P.E.
Everglades and Estuaries Protection
sfwmd.gov

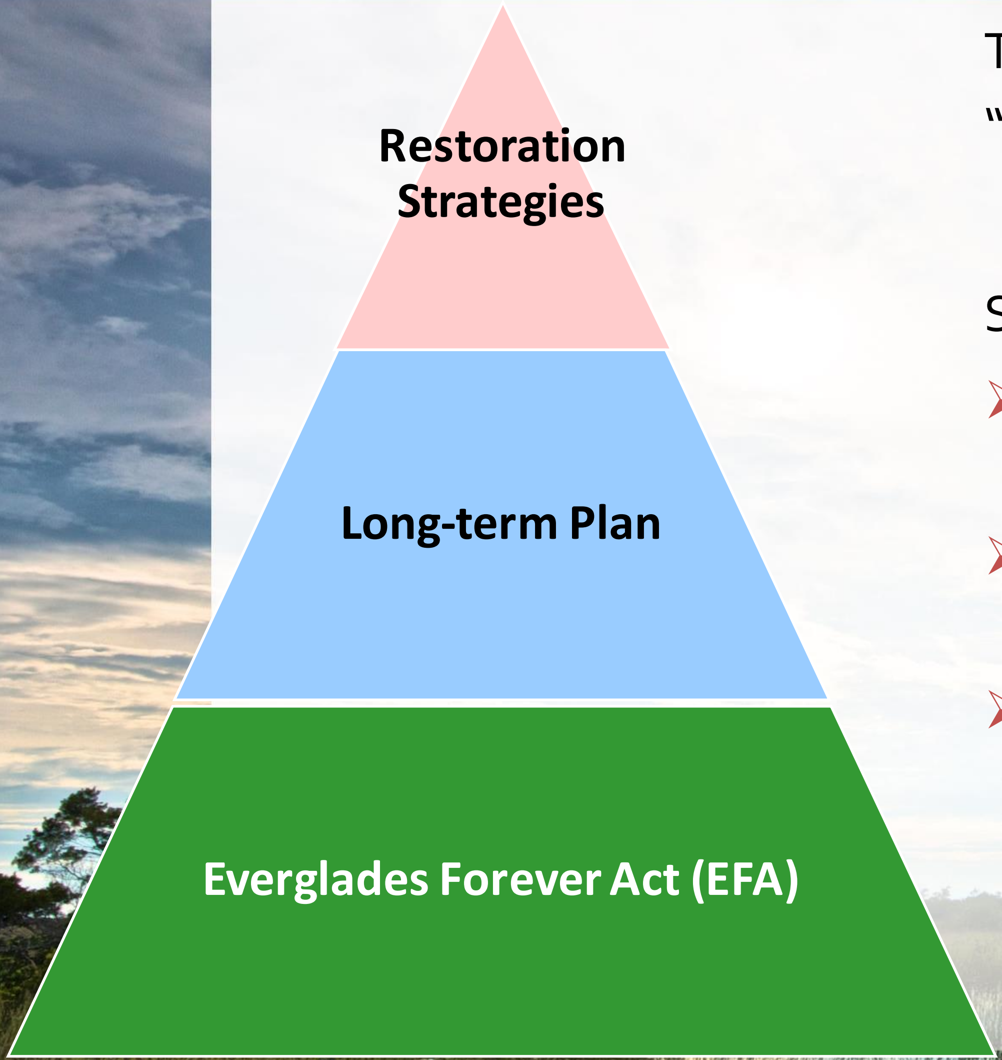
19th Annual Public Meeting on the Long-term Plan for Achieving Water Quality Goals for the Everglades Protection Areas Tributary Basins
February 28, 2022

Basins Tributary to the Everglades Protection Area





Long Term Plan Project Objectives

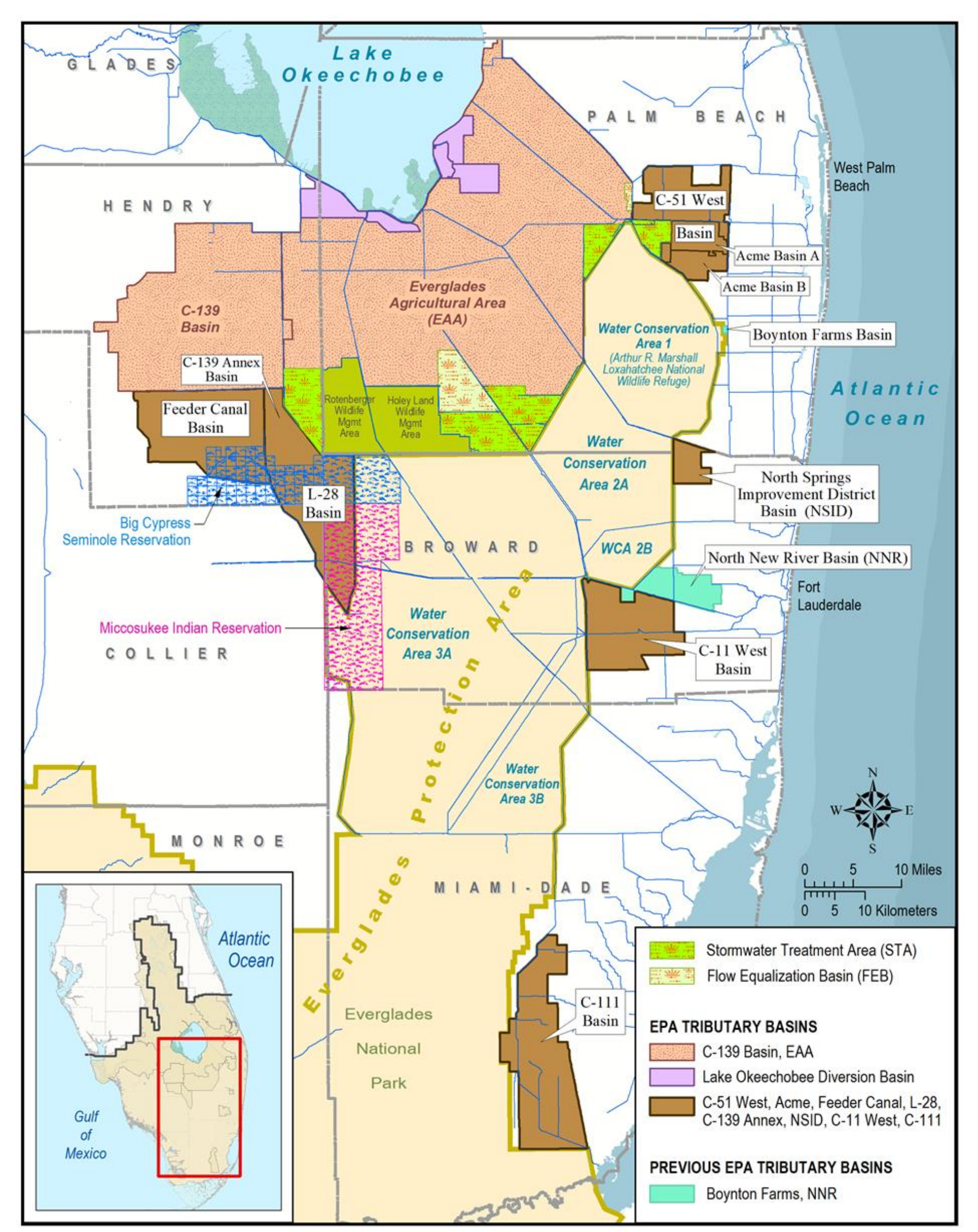


The Long-Term Plan recommends activities designed to:

"***Maintain and improve*** *upon the contribution of source controls to overall water quality improvement goals."*

Specifically:

- **Identify** discharges that are candidates for implementation of **cost-effective** source controls
- Characterize management practices on lands or processes tributary to those discharges
- Implement these source controls **in concert with** landowners or municipalities



Contents

- EAA and C-139 Basins
  - Regulatory compliance and activities
  - Research and demonstration projects
  - Sub-regional source control projects
- Other Tributary Basins
  - Regulatory and cooperative activities
  - Permit integration

WY2021 Total Phosphorus Data by Basin

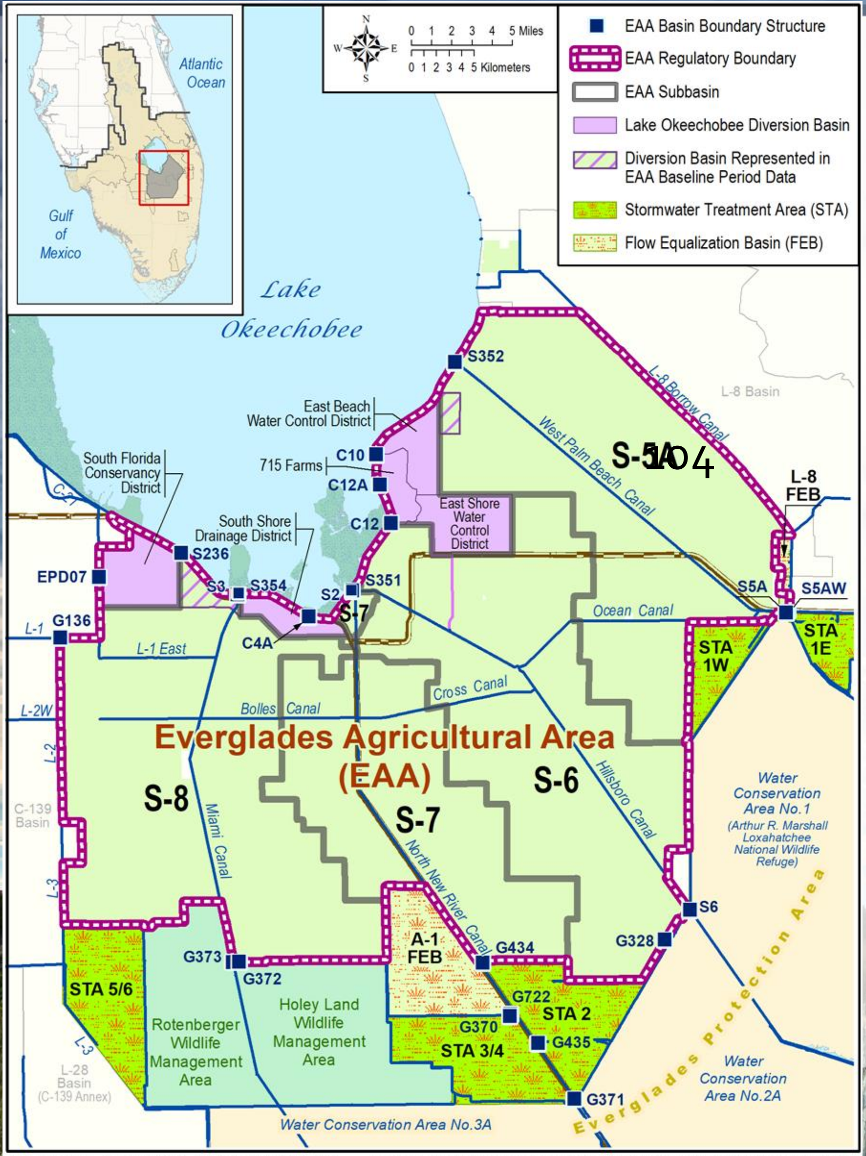
Basin	Receiving Water Body	WY2021 TP Load (metric tons)	WY2021 TP FWMC (µg/L)
Everglades Agricultural Area (EAA)	STAs and Lake Okeechobee	168	116
C-139	STA 5/6 and EAA	46	266
C-51 West (incl. Acme Improvement District)	STA-1E, C-51 East Basin, and WCA-1	30	131
L-28	WCA-3A	18	78
Feeder Canal	WCA-3A	16	139
C-11 West	WCA-3A	9	25
C-111	ENP	4	7
North Springs Improvement District (NSID)	WCA-2A	0.01	5

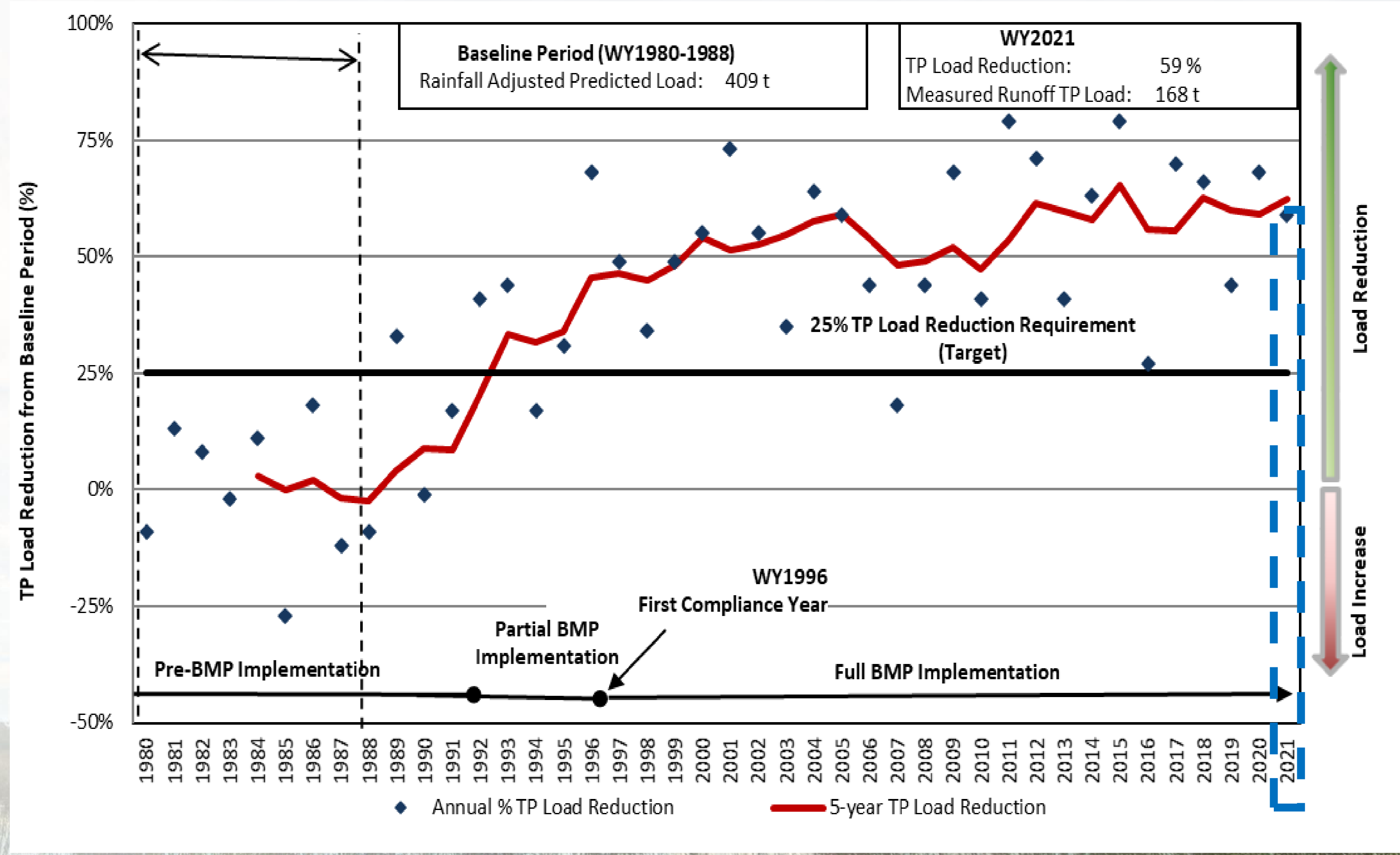
EAA and C-139 Basin Source Control Programs

Chapter 40E-63	EAA	C-139 Basin
Permit-level compliance	• Comprehensive BMPs • Permittee water quality monitoring • Post-permit compliance activities	• Comprehensive BMPs • Sub-basin water quality monitoring • Post-permit compliance activities
Basin-level water quality compliance	Reduce TP Loads by 25% in comparison to pre-BMP period levels	Maintain TP Loads below pre-BMP period levels
Research and Demonstration	EAA Everglades Protection District (EAAEPD) Research Master Permit	Demonstration projects in partnership with landowners
Supplementary Projects	Restoration Strategies EAA Eastern Flow path source control projects	Upstream monitoring initiatives

EAA Basin-Level Compliance

25% Reduction in TP Load





EAA BMP Master Research Permit

- The Everglades Forever Act (EFA) requires a comprehensive program of research, field testing and implementation of BMPs.
- Sponsored by EAA landowners through the EAA Environmental Protection District (EAAEPD).
  - Qualified experts (IFAS)
  - Identify appropriate BMPs
- BMPs field-tested in representative sites
  - Soil, crops, other factors affecting BMP design and effectiveness
- Outreach and Training provided by IFAS

Photo 1

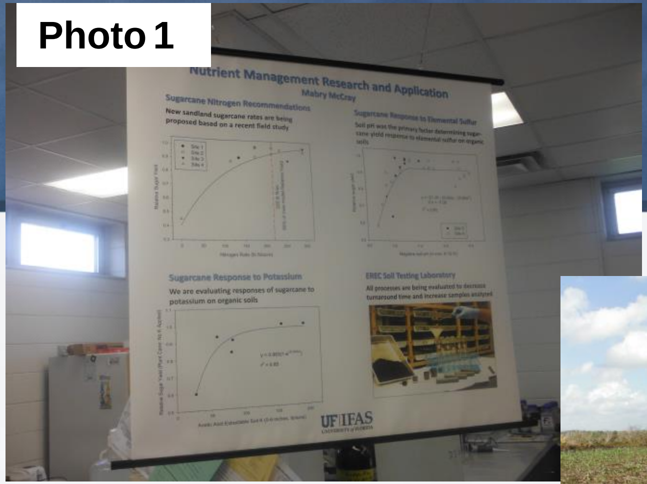


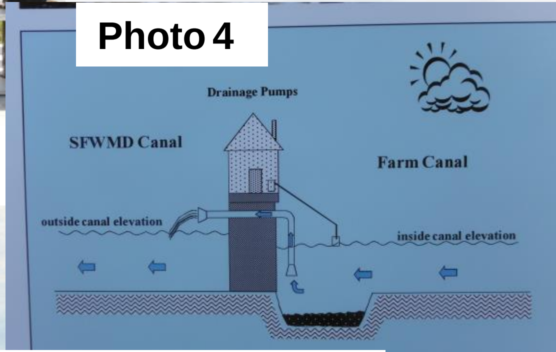
Photo 2



Photo 3



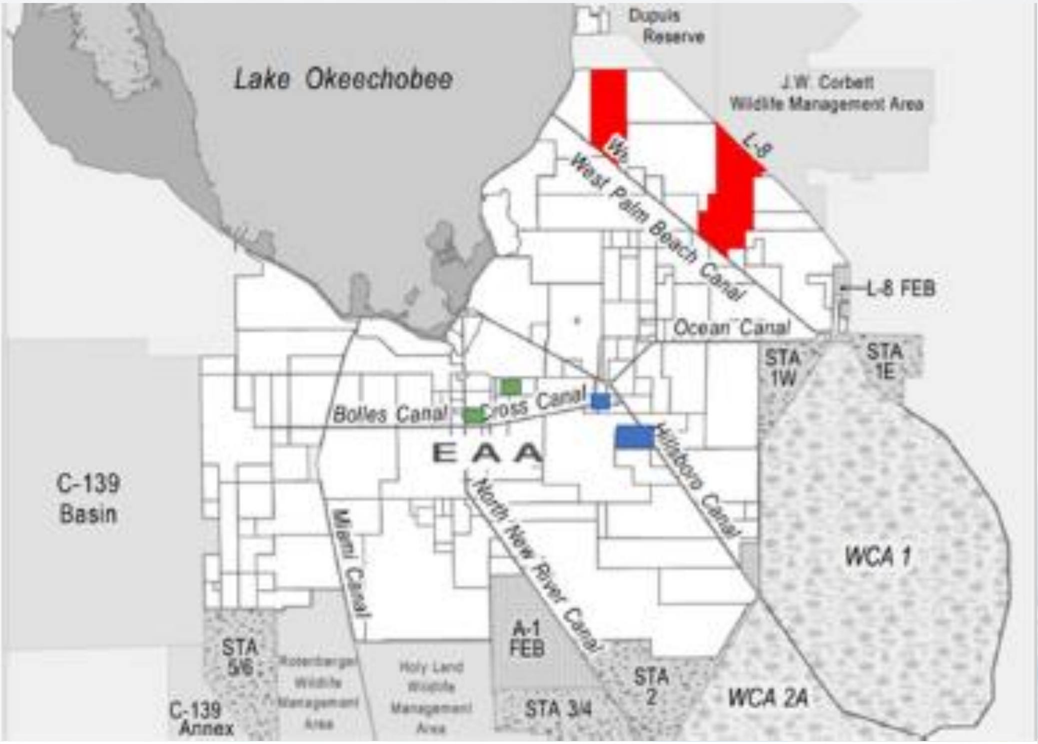
Photo 4



Photos:
1. Soil Testing Research at UF-IFAS Belle Glade
2. Controlled application
3. Aquatic vegetation and sediments research at UF-IFAS
4. Discharge pump diagram at UF-IFAS

EAA BMP Master Research Permit

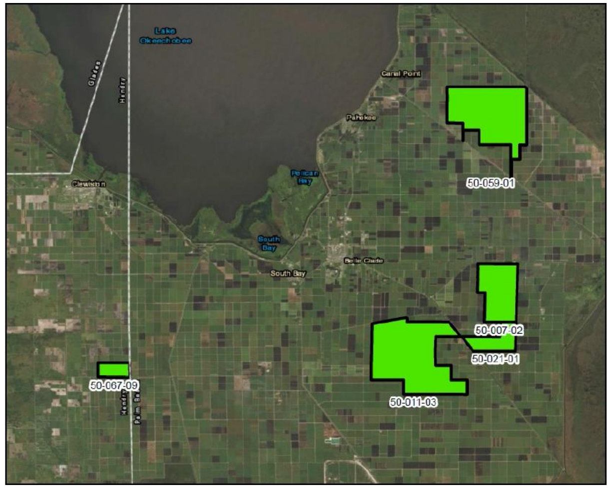
- A 5-year EAA-EPD Master Research Permit was issued on September 15, 2020.
- This research evaluates performance differences between EAA farm basins with similar BMPs.
- Six farms were selected for this research project that started on October 1, 2020.
- Performed soil analyses, phosphorus chemistry, and phosphorus saturation analyses.
- 2021 annual report completed in July 2021.



Legend	Farm Basin ID
Red	50-018-01 and 50-018-03
Blue	50-028-01 and 50-048-01
Green	50-061-07 and 50-061-12

Priority Permit Basins Consultations

- Six permit basins were identified in the EAA as priority based on the TP load contribution in EAA Restoration Strategies flow paths.
- Virtual and field consultations conducted by UF IFAS in the selected **five** permit basins.
- Performed analysis of basins conditions and sediment control BMPs.
- Final report titled "Report of IFAS Extension Services for Selected Basins in the EAA" completed in October 2021.





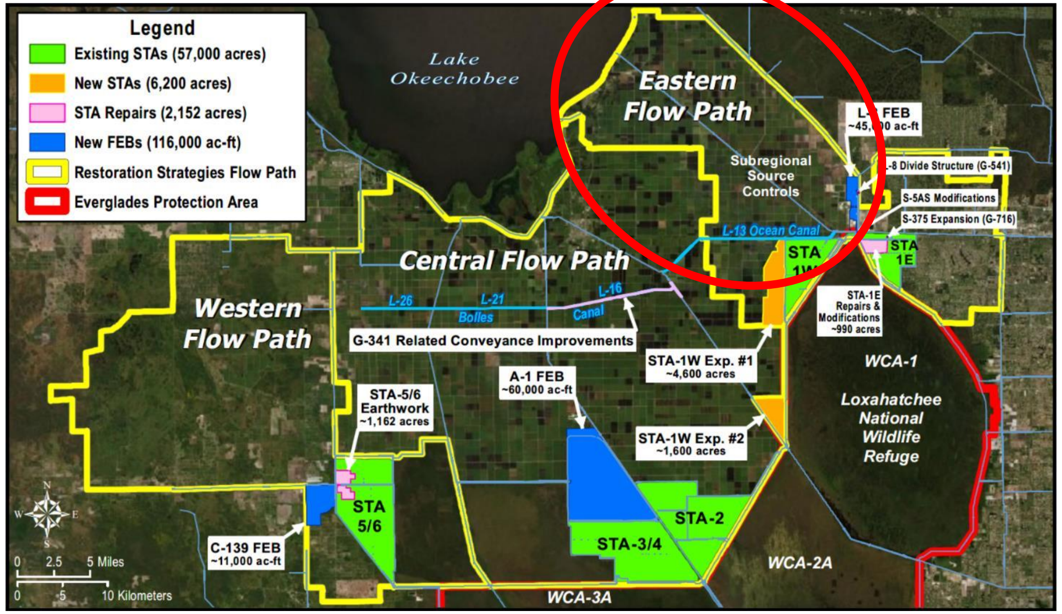




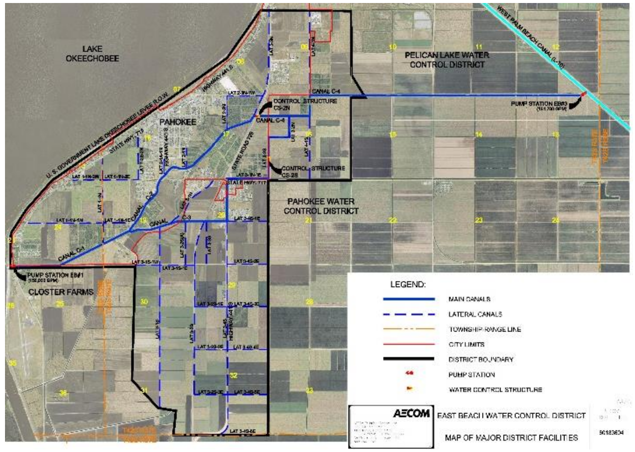
Presenters: Youchao Wang and Steve Sarley

Restoration Strategies
Sub-regional Source Controls

- Build on the SFWMD regulatory BMP program
- Projects…
  - Strategic on-site locations or sub-regional source control projects in series with on-site BMPs
  - Focus on areas and projects with the greatest potential to improve water quality
  - Designed to increase retention or detention of TP above what is currently required
- Evaluating the feasibility of implementing water quality improvement measures in the East Beach Water Control District





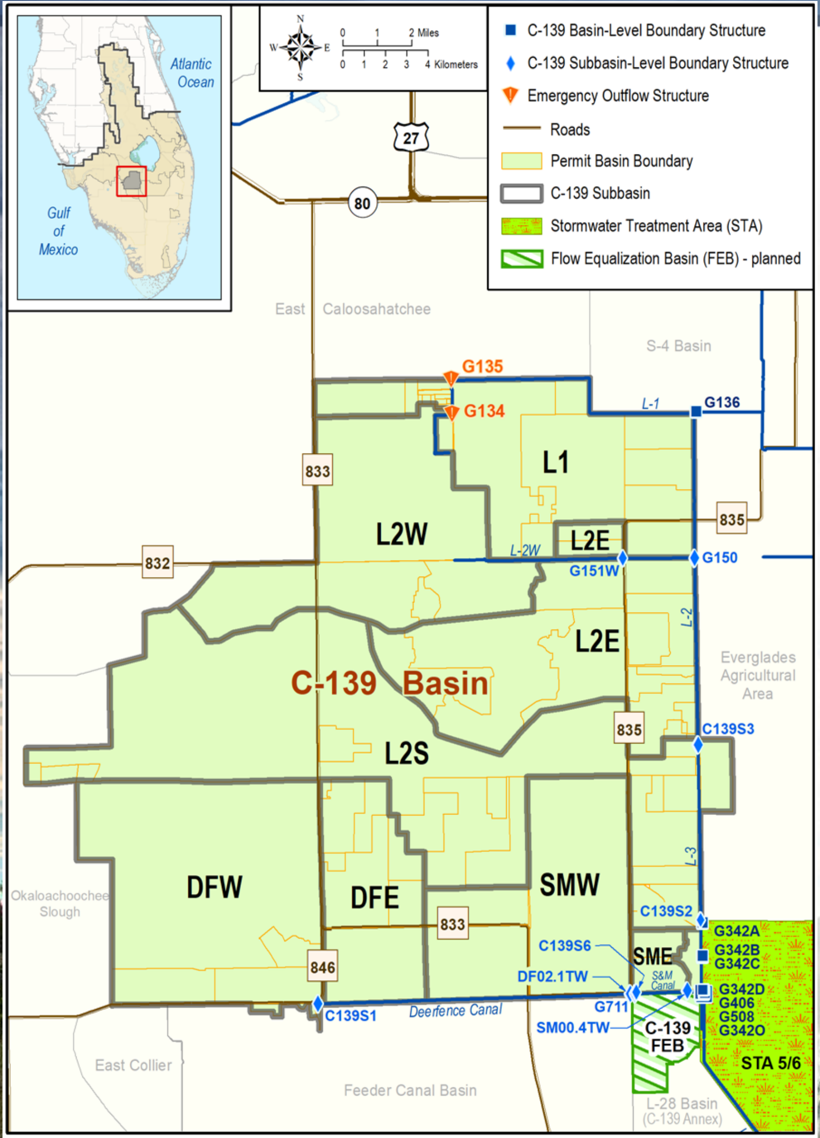


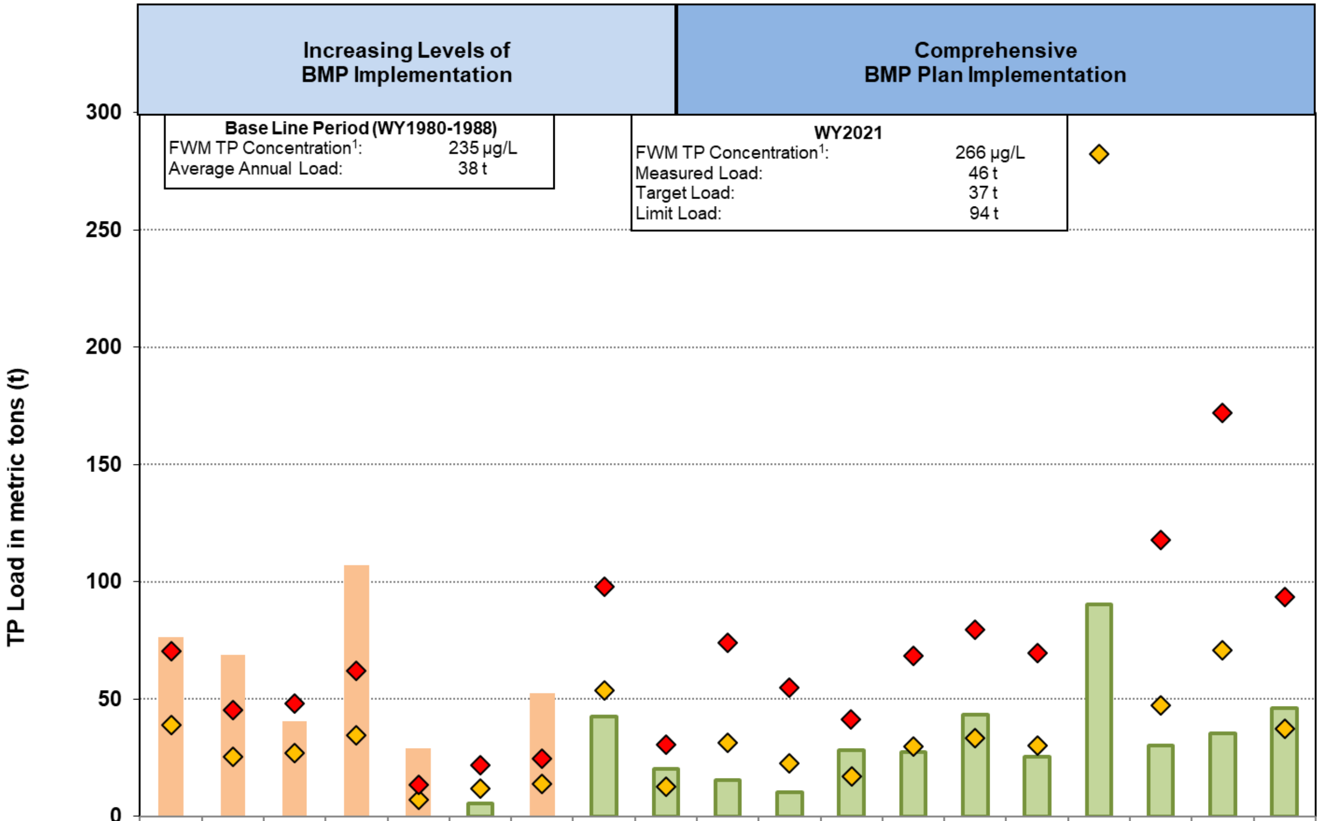
sfwmd.gov

Presenters: Youchao Wang and Steve Sarley

C-139 Basin Level Compliance

TP Load below historic levels





	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Performance Not Met	76	69	41	107	29		52												
Performance Met						5		43	20	15	10	28	27	43	26	90	30	36	46
Target Load	39	25	27	35	7	12	14	54	13	32	22	17	30	33	30	283	47	71	37
Limit Load [2]	70	45	48	62	13	22	25	98	31	74	55	41	69	80	69	887	118	172	94

Water Year Results

[1] Flow Weighted Mean (FWM) TP Concentration is a calculation rather than a measured value.
[2] WY2018 Limit Load off-scale

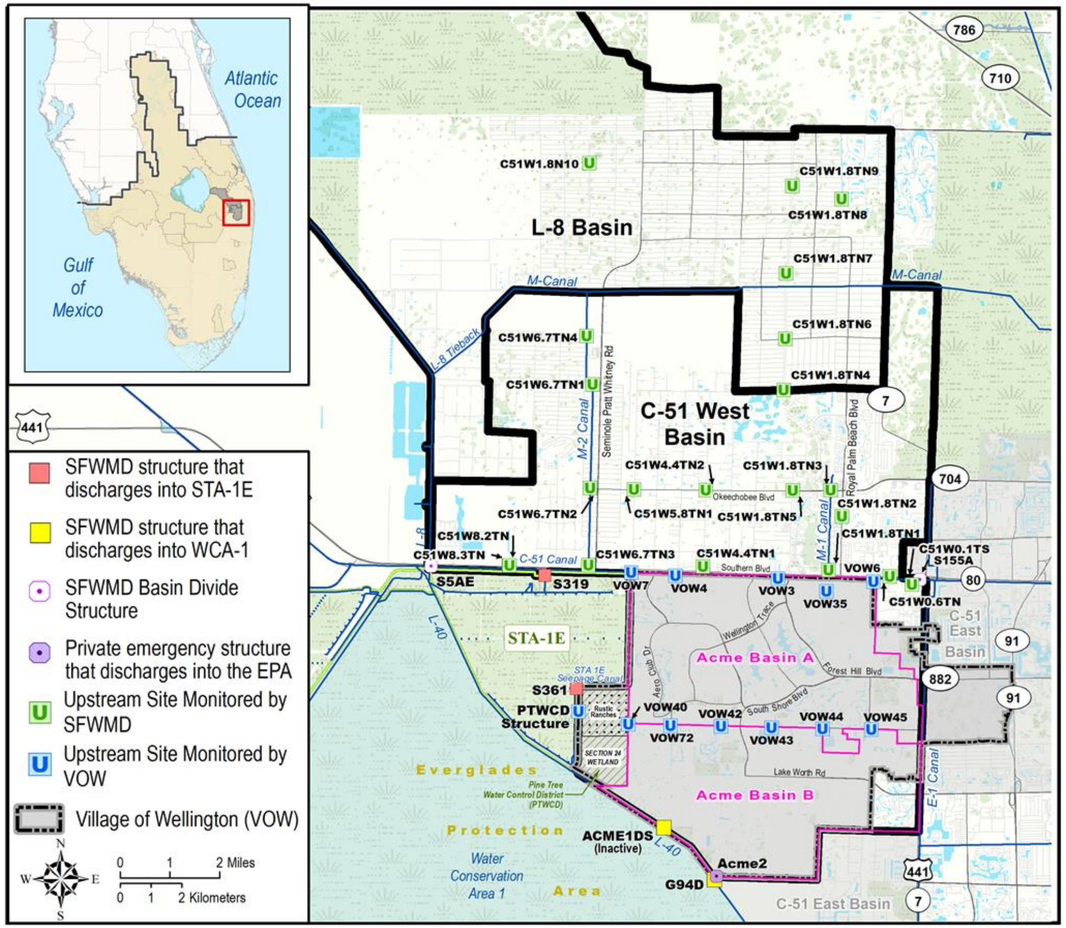
Presenters: Youchao Wang and Steve Sarley

Other Tributary Basins



Presenters: Youchao Wang and Steve Sarley

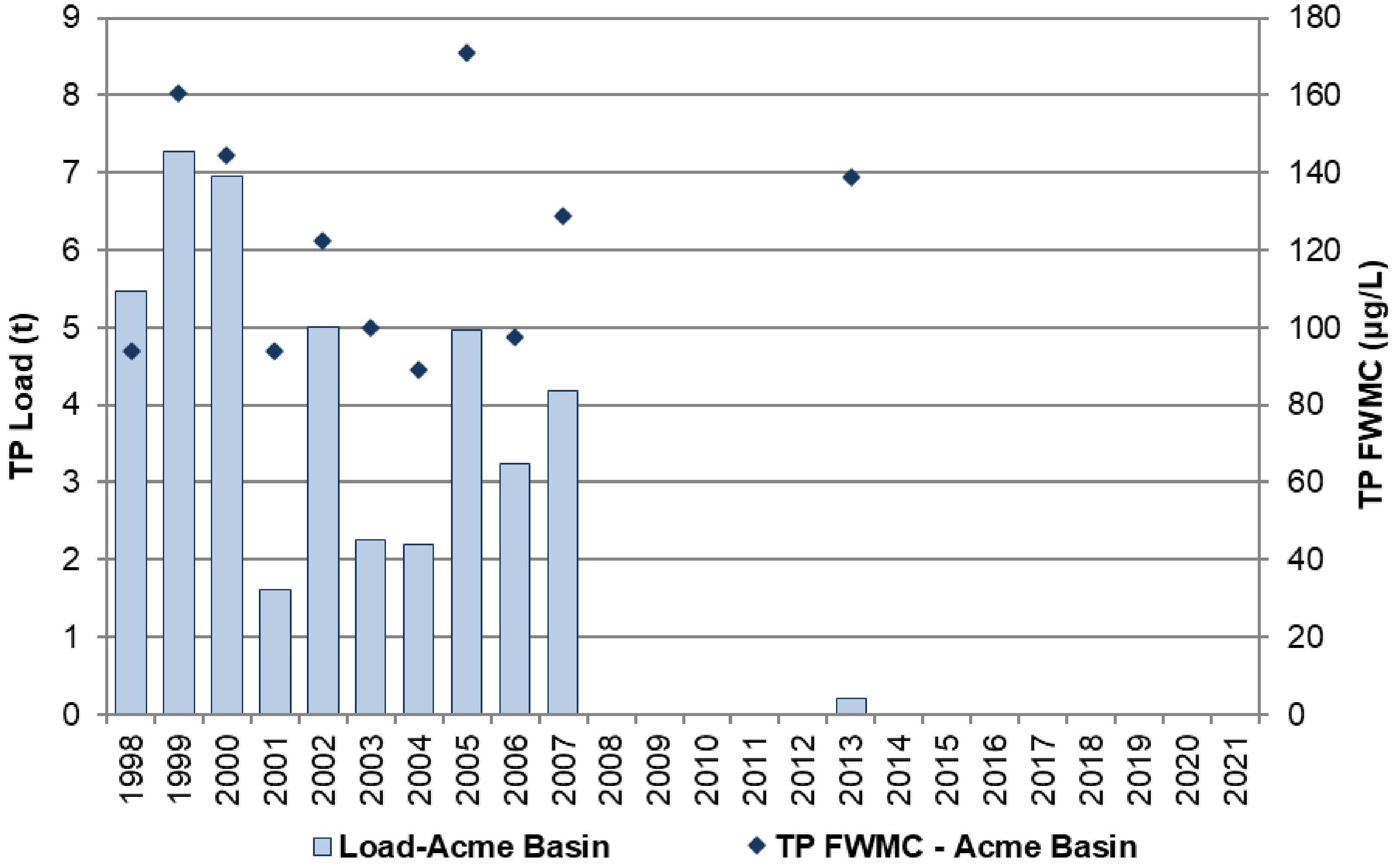
C-51 West and Acme Basin



User Name: nimiller Remedy Ticket: 109259 Map Produced on Date: 1/14/2020 1:38:21 PM Doc Path: \\ad.sfwmd.gov\dfsroot\data\err_gis\projects\EVG\NE_sourceControl\mxd\20200114C51W_WY2019.mxd

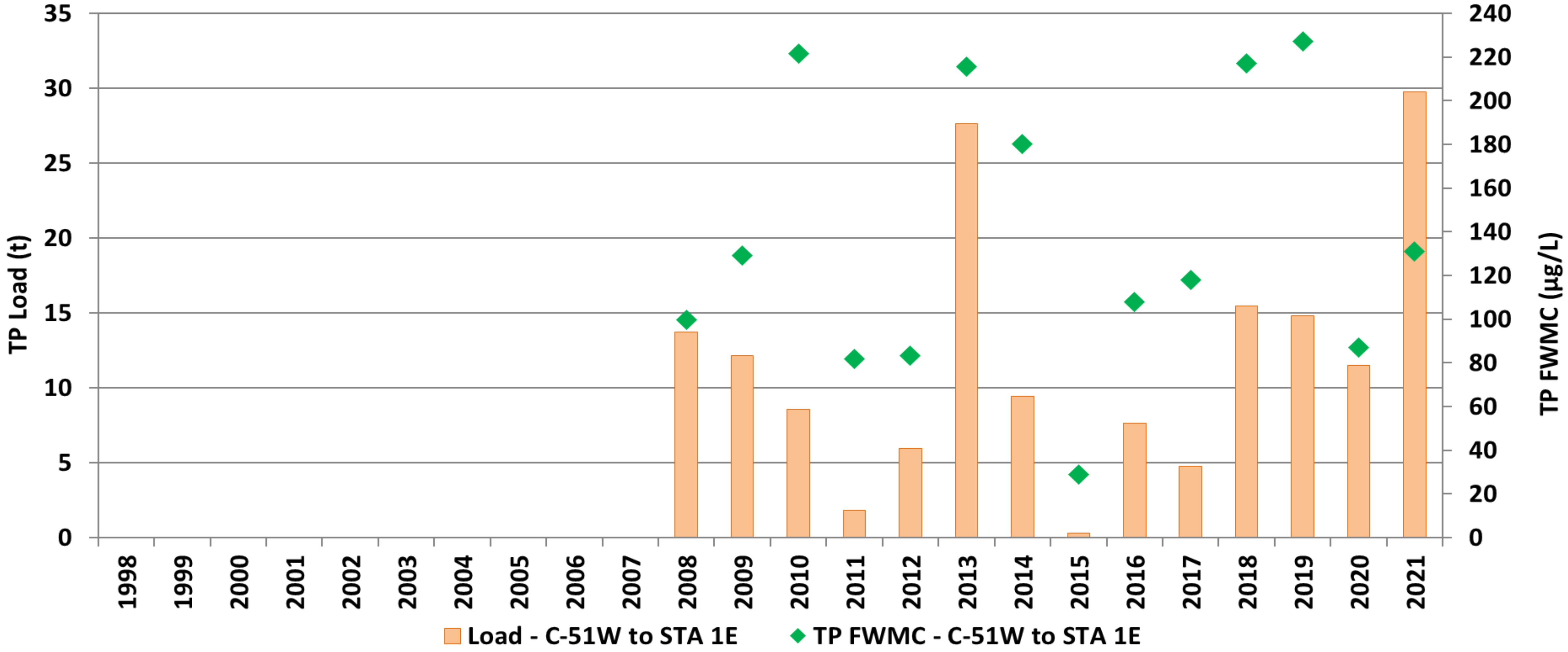
- Environmental Resource Permits issued to Village of Wellington (VOW) and Pine Tree WCD (PTWCD) and VOW ordinance include conditions that require
  - BMPs and livestock waste storage and disposal requirements in coordination with FDACS
  - Water quality monitoring program throughout the Acme basin (U markers)
- 2019: Expanded water quality monitoring program to include areas north of the C-51 West Canal
  - 12 active sampling sites (U markers)

C-51 West and Acme Basin to Refuge



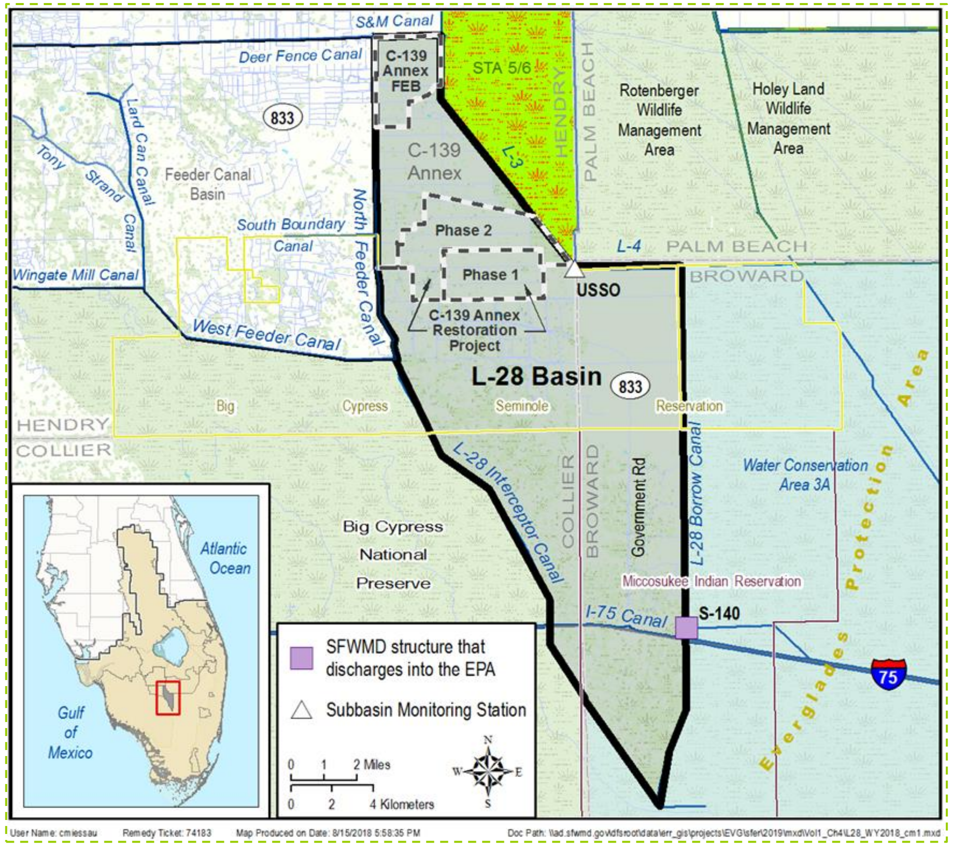
Presenters: Youchao Wang and Steve Sarley

C-51 West and Acme Basin to STA 1E



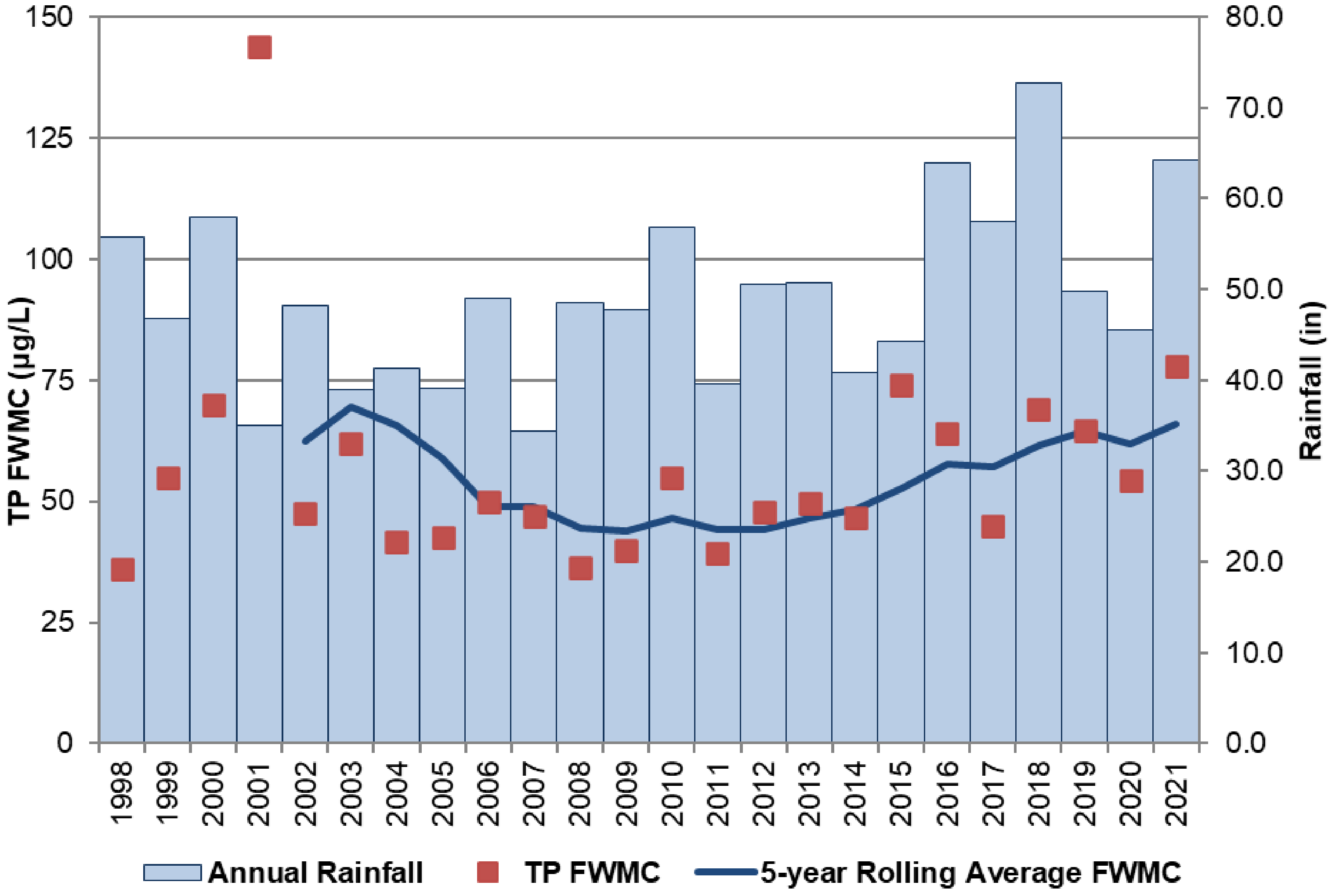
Presenters: Youchao Wang and Steve Sarley

L-28 Basin



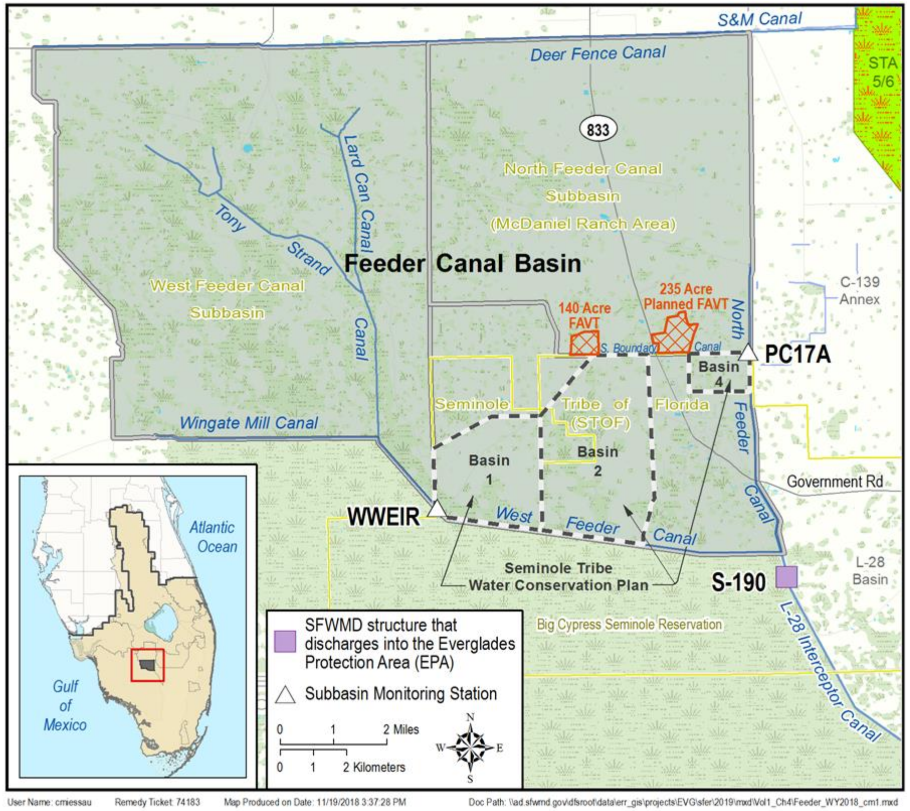
- Environmental Resource Permit issued to Southern Gardens Groves in the C-139 Annex includes conditions for best management practices
- LTP projects:
  - CERP Big Cypress/L-28 Interceptor Modification (WERP)
- Other basin projects:
  - C-139 Flow Equalization Basin
  - Sam Jones Abiaki Prairie Restoration

L-28 Basin



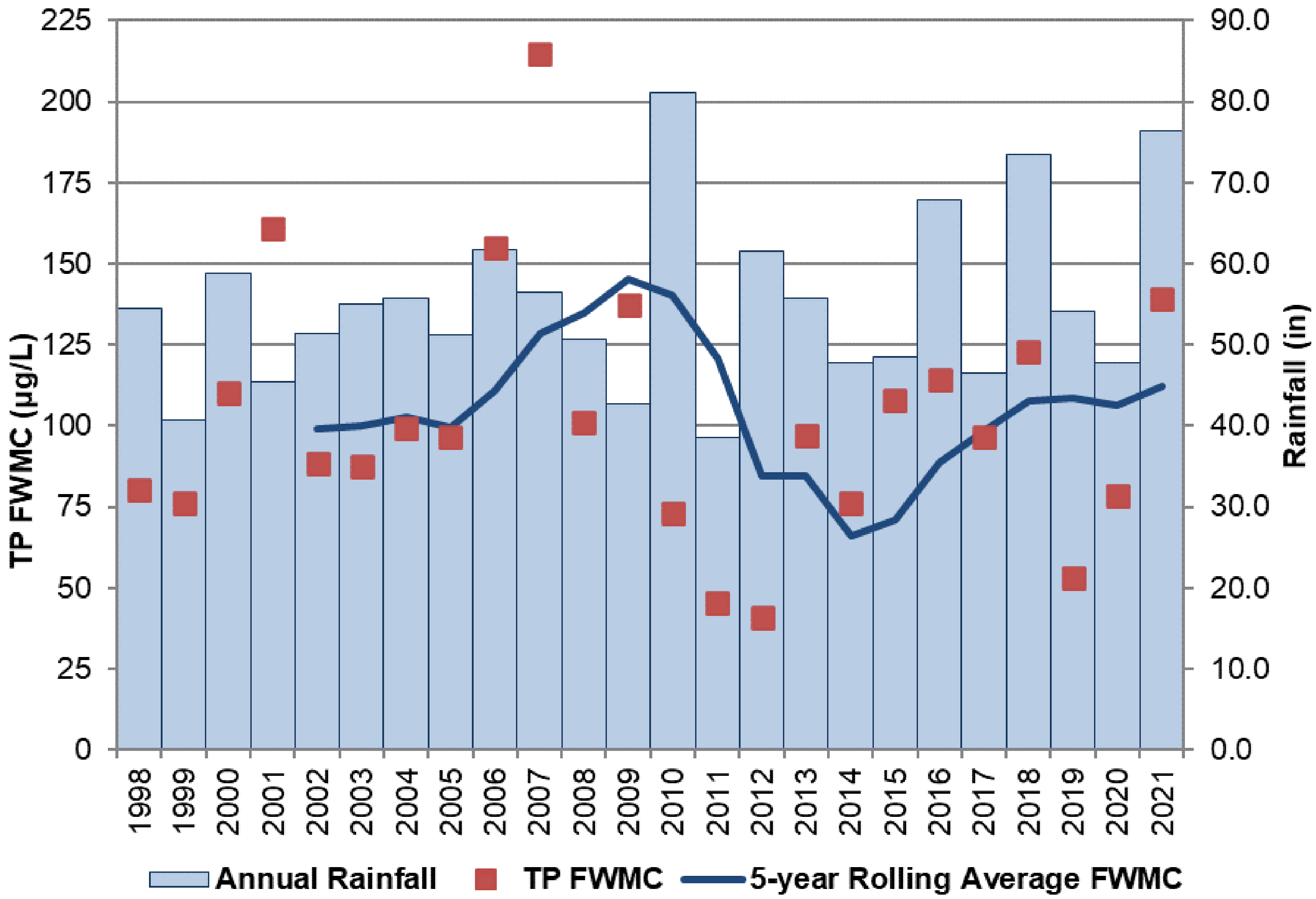
Presenters: Youchao Wang and Steve Sarley

Feeder Canal Basin



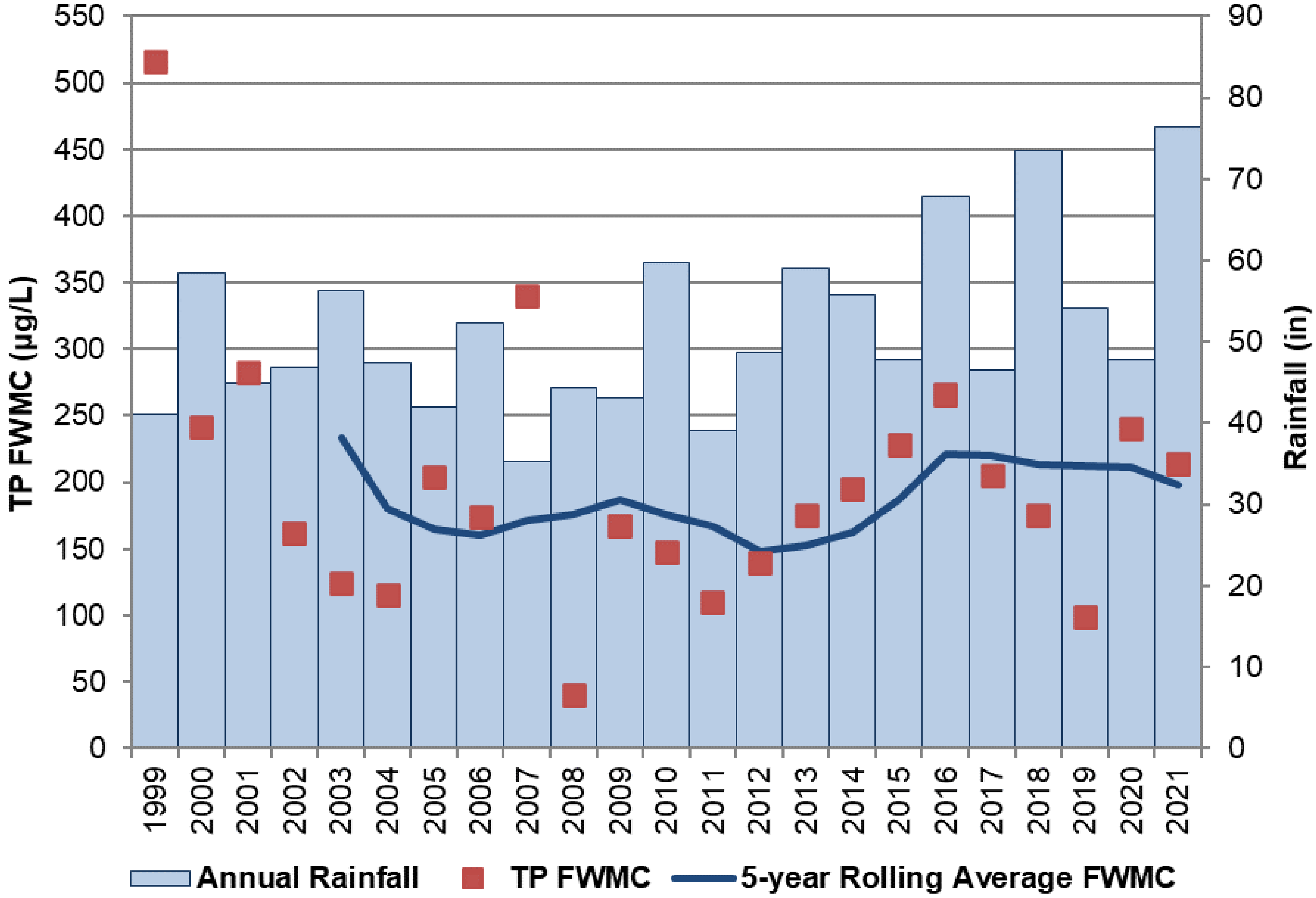
- North Feeder Subbasin:
  - Environmental Resource Permits issued to landowners include conditions for best management practices BMPs and water quality monitoring
  - Voluntary FAV tilling projects
- West Feeder Subbasin:
  - Landowners can enroll in the FDACS BMP program.
- CERP Big Cypress/L-28 Interceptor Modification (WERP)

Feeder Canal Basin



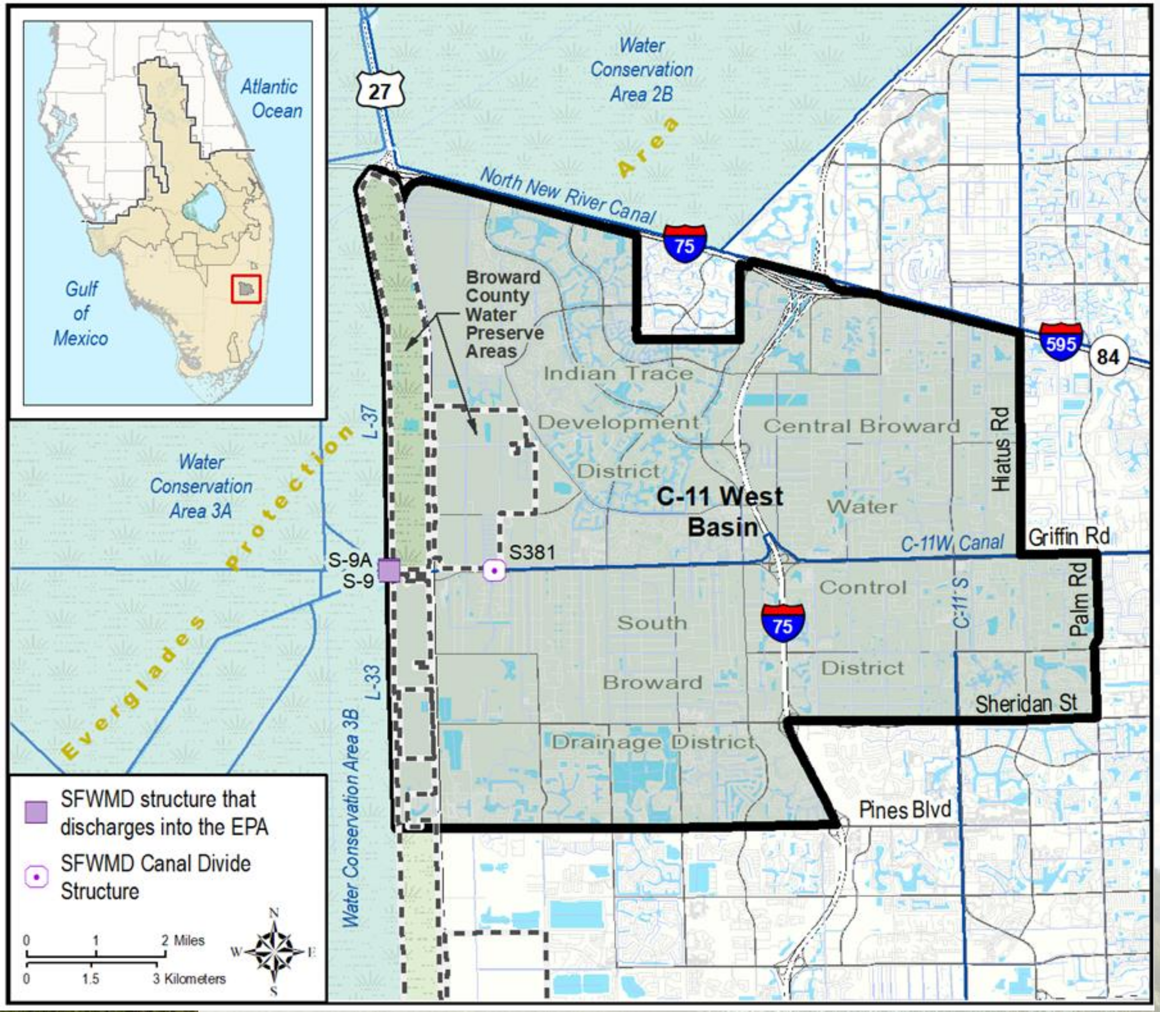
Presenters: Youchao Wang and Steve Sarley

Feeder Canal Basin
North Feeder Canal Sub-basin



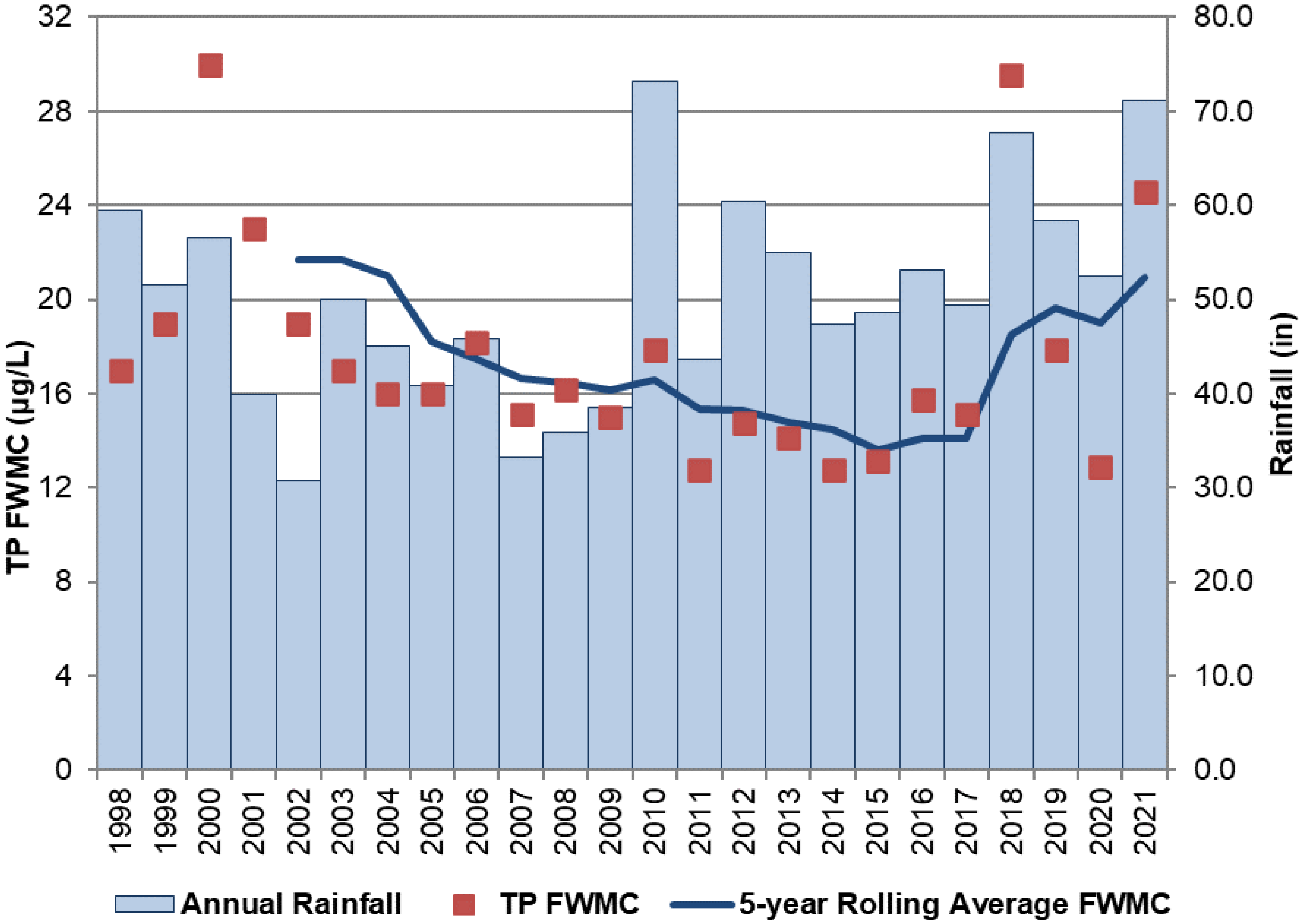
Presenters: Youchao Wang and Steve Sarley

C-11W Basin



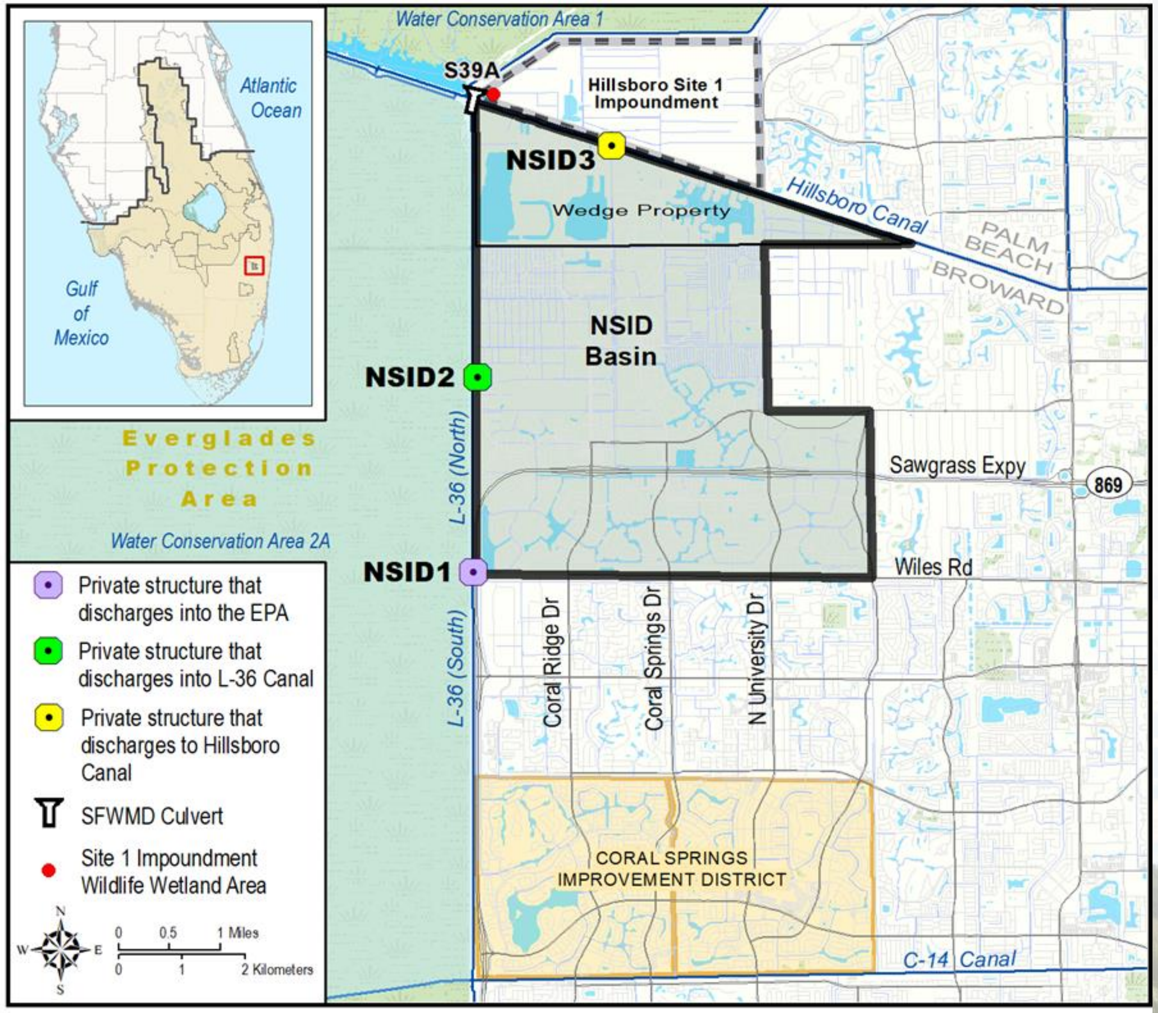
- Environmental Resource Permits issued to water control districts include conditions for best management practices including optimized detention of runoff and water quality monitoring
- Basin project:
  - CERP Broward County Water Preserve Area

C-11W Basin



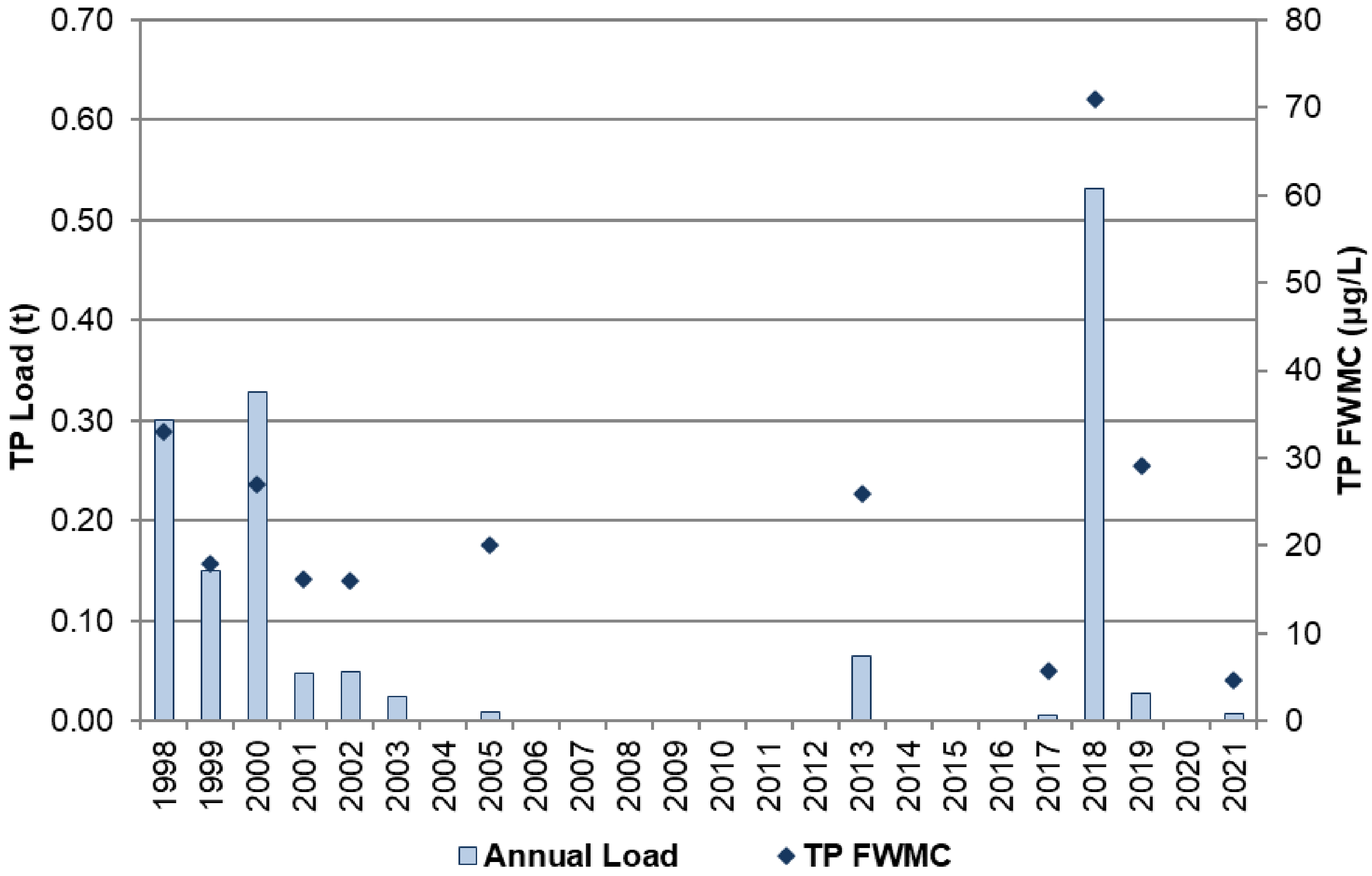
Presenters: Youchao Wang and Steve Sarley

NSID Basin



- Environmental Resource Permits issued to NSID include conditions requiring best management practices implementation, water quality reporting, and phosphorus load limits for discharges to WCA-2A.
- LTP project:
  - CERP Hillsboro Site 1 Impoundment Phase 2 needs congressional authorization before moving forward

NSID Basin


0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
TP Load (t)
80
70
60
50
40
30
20
10
0
TP FWMC (µg/L)
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Annual Load
TP FWMC

Summary

- For the EAA basin, WY2021 TP load reduction is 59%. With the WY2021 results, the 26-year average annual TP load reduction for the program is 57%.
- For the C 139 basin WY 2021 remained in compliance, although the target level for phosphorus load was exceeded.
- For the other tributary basins during WY2021, voluntary BMP implementation and progress toward the completion of CERP projects continued.
- The continued success of and ongoing improvements to the Southern Everglades source control program rely on verifying BMP implementation, continuing meaningful research and tracking program performance based on WQ data and basin-specific metrics.

Additional Information

Chapter 4:
Nutrient Source Control Programs
in the Southern Everglades

www.sfwmd.gov/sfer

Contact Information

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or

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Public Use on SFWMD Stormwater Treatment Areas

James R. Harbaugh
Recreation Planner
Land Resources
sfwmd.gov

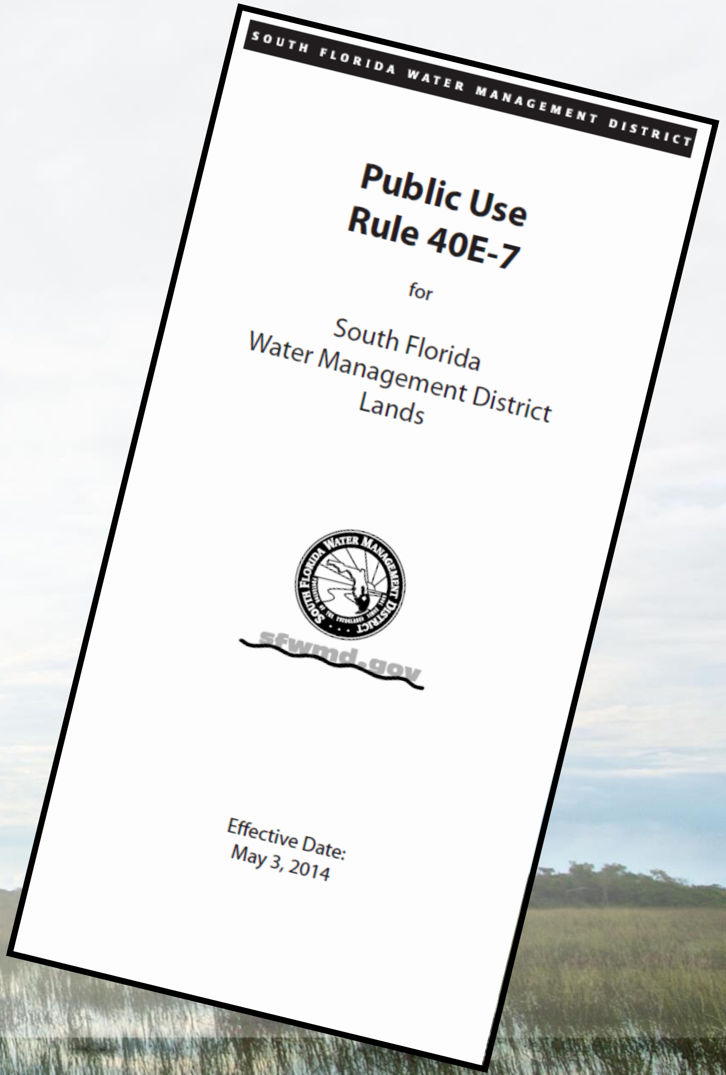


Everglades National Park

19th Annual Public Meeting on the Long-term Plan for Achieving Water Quality Goals for the Everglades Protection Areas Tributary Basins
February 28, 2022

Mission

- **Why have Public Use?**
  - 373.4592 "the district shall allow these areas to be used by the public for recreational purposes… unless such uses are incompatible with the restoration goals of the Everglades Construction Project.."
  - Will not interfere with intent of project purpose


SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Public Use
Rule 40E-7

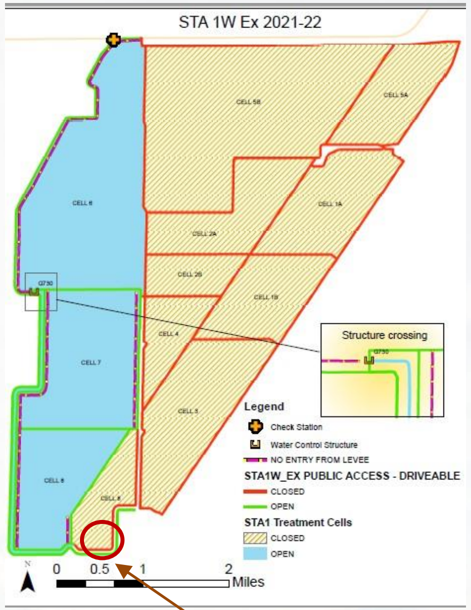
for

South Florida
Water Management District
Lands

Effective Date:
May 3, 2014

STA Function vs Public Use

- **A working property**
  - Engineered Restoration
    - Managed Wetland to improve water quality
  - **Internal consultation for access**
    - Veg Management Team
  - Construction - Project Manager
    - Field Operations
      - Public access hours
        - Fri - Mon
    - Land Stewardship T/E Wildlife



G780





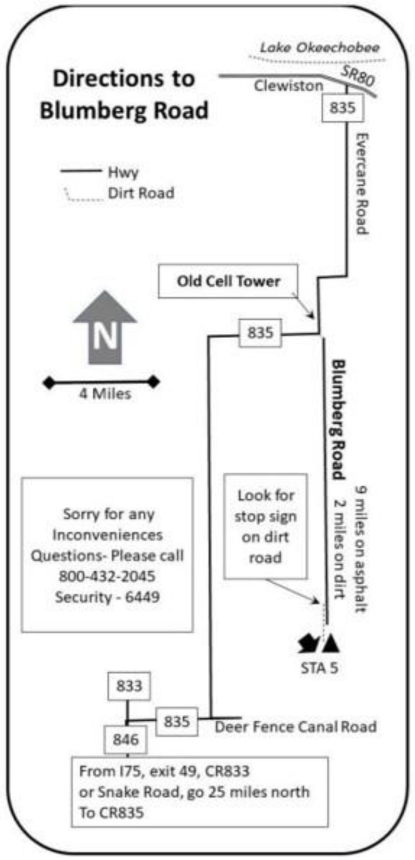
- Goal to provide compatible recreation without compromising operation and management activities

Construction, Maintenance & Wildlife

- Goal to provide compatible recreation without compromising operation and management activities

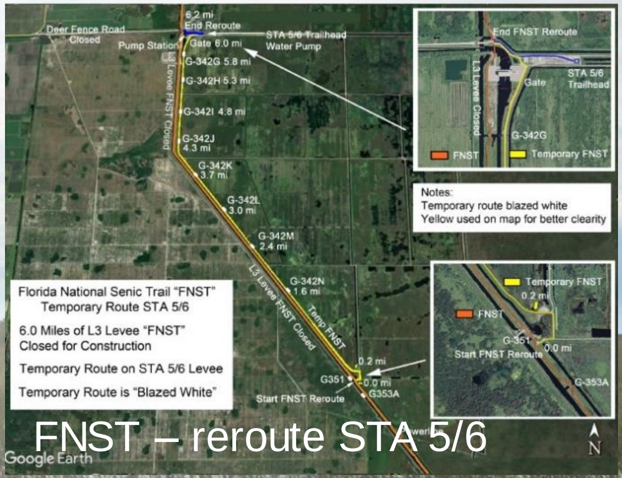
- **Necessary Closures**
  - Construction zone
    - Safety/Deadlines
  - Post construction Veg recovery
  - Wildlife considerations





STA 5/6 entrance





Partnerships

- **SFWMD**
  - Responsibility to provide recreation opportunities
- **Stakeholders/Partners**
  - Florida Fish and Wildlife Commission -FWC
  - Florida National Scenic Trail - FNST
  - Audubon Society
  - Conservation/Recreation Clubs
    - i.e.- United Waterfowlers of Florida
    - South Florida Amateur Astronomer Assoc
    - Many others

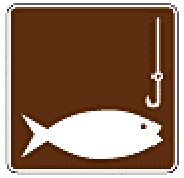
Nature Based Recreation Types

- **Nature based recreation from levees**
  - Hiking
  - Wildlife Viewing
  - Biking
  - Day use picnic
  - Fishing
- **Recreation within cells**
  - Hunting















Nature Based Recreation

- **Guided Wildlife Viewing**
  - STA 5/6
    - Hendry Glades Audubon
  - STA 1E
    - Everglades Audubon
  - Lakeside Ranch
    - Martin Co. Audubon
- **Hiking/Biking**
  - All STA's
    - Fri - Mon
  - STA 5/6
    - FNST – L3 rerouted


STA-1 W

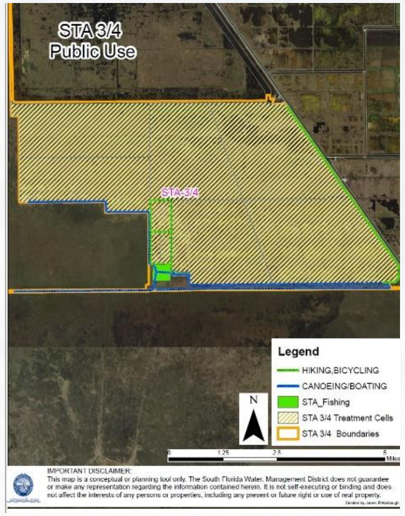

STA-2 Flamingos


FNST – C18


Cycling STA's

Nature Based Recreation

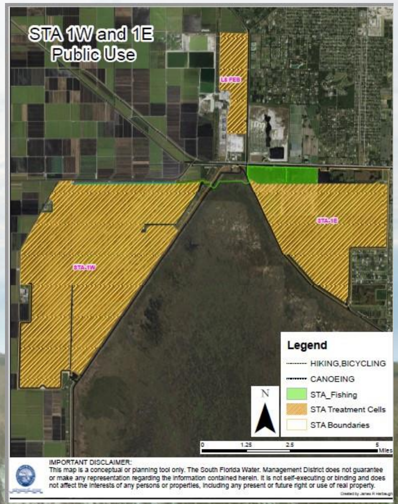
- **FWC quota hunt – ECP STA's**
  - Waterfowl & Alligator
    - Access into cells limited
      - Designated access points
- **FWC Youth Hunt Program**
    - Waterfowl and alligator
- **FWC -Other specialty hunts**
  - Wounded Warrior
  - Youth Hunt







- **Fishing non impacting area**
  - i.e. Discharge canals
  - STA 1E & 1W
    - Bank fishing
  - STA 3/4 - Harold Campbell
    - Motorboat access
    - non treatment cell



Growing Opportunities

- **Since ECP inception - other non ECP water resource projects = more recreation opportunities**
  - Lakeside Ranch
    - Phase 2 completed
      - Becoming a popular destination
  - Nubbin Slough
    - Designated STA for open recreation
  - C44 – Reservoir and STA
    - Rec infrastructure designs - finalize
  - Under construction
    - C139 – FEB, C43 – Reservoir
  - Future opportunities
    - C23/C24 Reservoir/ STA
    - And more ...




Nubbin Slough STA

Moving forward – phase involvement

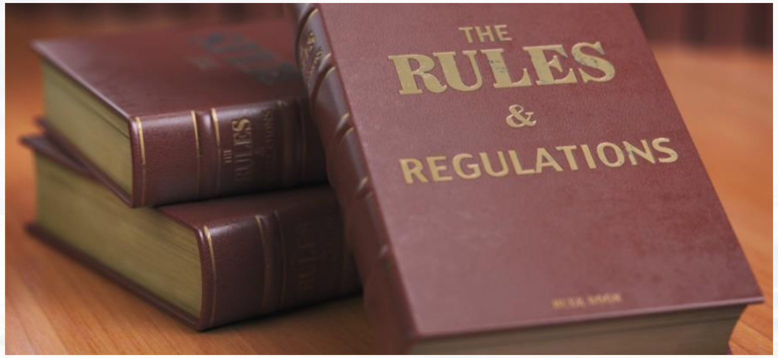
- Recreation Infrastructure Standards incorporated in design phase
- Implement Construction
- Construction completion
- Testing phase/finalizing rec infrastructure
    - ADA considerations, Facilities, Access points, barriers, etc.
- Consulting with internal staff
- Public Input
    - Recreation considerations
        - Hunting
        - Birding tours
        - Etc.
- Testing completion
- Governing Board approval

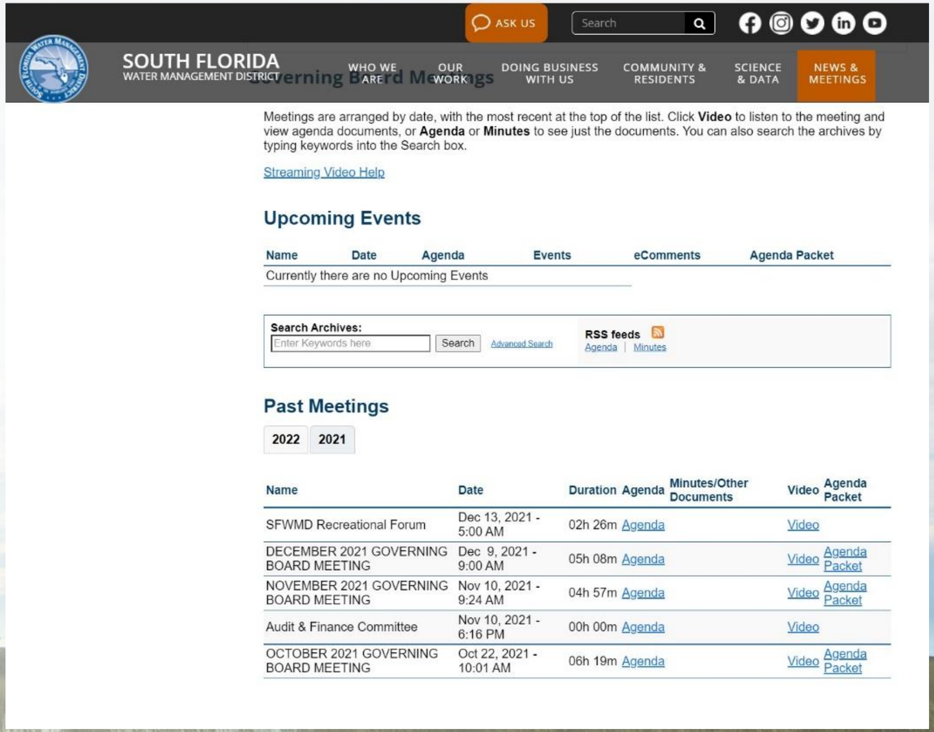




Public Participation

- Public Meetings - SFWMD
  - Public Meetings and Forums | South Florida Water Management District (sfwmd.gov)
  - Rec Forum – Quarterly
- Proposed Rule Changes - FWC
  - Proposed Rule Changes | FWC (myfwc.com)




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WHO WE ARE | OUR WORK | DOING BUSINESS WITH US | COMMUNITY & RESIDENTS | SCIENCE & DATA | NEWS & MEETINGS
Governing Board Meetings

Meetings are arranged by date, with the most recent at the top of the list. Click **Video** to listen to the meeting and view agenda documents, or **Agenda** or **Minutes** to see just the documents. You can also search the archives by typing keywords into the Search box.

Streaming Video Help

Upcoming Events

Name	Date	Agenda	Events	eComments	Agenda Packet
Currently there are no Upcoming Events					

Search Archives: Enter Keywords here | Search | Advanced Search
RSS feeds Agenda | Minutes

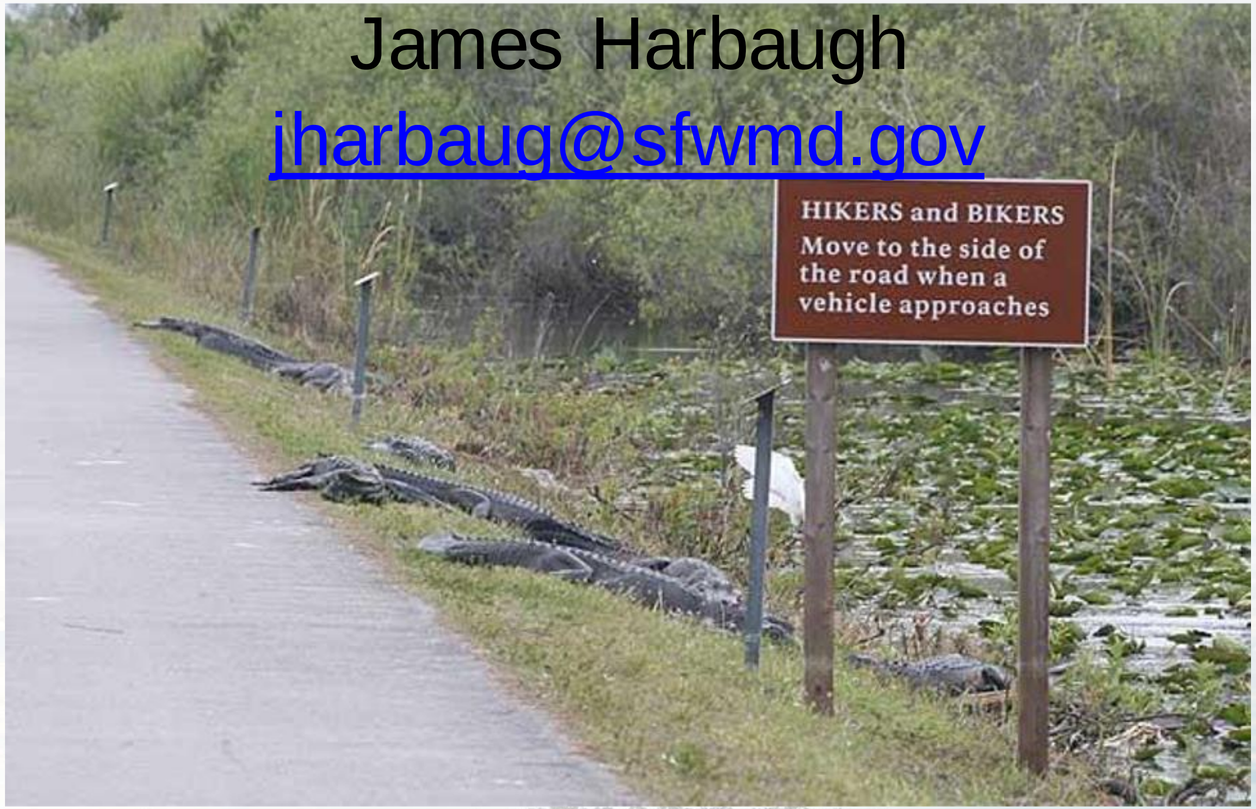
Past Meetings

2022 | 2021

Name	Date	Duration	Agenda	Minutes/Other Documents	Video	Agenda Packet
SFWMD Recreational Forum	Dec 13, 2021 - 5:00 AM	02h 26m	Agenda		Video	
DECEMBER 2021 GOVERNING BOARD MEETING	Dec 9, 2021 - 9:00 AM	05h 08m	Agenda		Video	Agenda Packet
NOVEMBER 2021 GOVERNING BOARD MEETING	Nov 10, 2021 - 9:24 AM	04h 57m	Agenda		Video	Agenda Packet
Audit & Finance Committee	Nov 10, 2021 - 6:16 PM	00h 00m	Agenda		Video	
OCTOBER 2021 GOVERNING BOARD MEETING	Oct 22, 2021 - 10:01 AM	06h 19m	Agenda		Video	Agenda Packet

Contact Information

James Harbaugh
jharbaug@sfwmd.gov



PUBLIC COMMENT

If you’re participating via Zoom – use the Raise Hand feature

If you’re participating via Phone –
*9 Raises Hand
*6 Mutes/Unmutes